APPENDIX D

HHRA

Appendix D-1.1 Sediment Samples Used for Analysis

Data Set	Site ID	Sample ID
Background	Background North	BMN-01-MX-1
		BMN-02-MX-1
		BMN-02-MX-1-D
		BMN-03-MX-1
	Background South	BMS-01-MX-2
		BMS-02-MX-2
		BMS-03-MX-1
		BMS-03-MX-1-D
Site	Makua North Muliwai	NMM-02-MX-1
		NMM-03-MX-1
		NMM-04-FL-1
		NMM-05-MX-1
		NMM-06-MX-1
		NMM-07-MX-3
		NMM-09-MX-1
		NMM-10-FL-1
		NMM-11-MX-1
		NMM-11-MX-2
		NMM-11-MX-3
		NMM-12-FL-3
		NMM-13-MX-3
		NMM-14-MX-1
		NMM-15-MX-1
		NMM-16-FL-3
		NMM-16-FL-3-D
		NMM-17-MX-2
		NMM-18-MX-3
		NMM-20-FL-1
		NMM-21-MX-3
		NMM-22-MX-1
	Makua South Muliwai	SMM-01-MX-1
		SMM-02-FL-1
		SMM-03-MX-1
		SMM-04-MX-1
		SMM-05-MX-1
		SMM-06-FL-1
		SMM-07-MX-1
		SMM-08-MX-1
		SMM-09-MX-1
		SMM-11-MX-1
		SMM-12-MX-1
		SMM-13-FL-3
		SMM-13-FL-3-D
		SMM-14-FL-1

Appendix D-1.2 Tissue Samples Used for Analysis

Area	Data Set	Site ID	Matrix	Species	Sample ID
Muliwai	Site	Makua North Muliwai	Fish	Striped mullet	1
			Fish	Tilapia	1b
			Fish	Hawaiian flagtail	3
			Fish	Tilapia	4
			Fish	Tilapia	5
			Shellfish	Samoan crab	MNM - 04
		Makua South Muliwai	Fish	Striped mullet	2fd
			Fish	Striped mullet	6
			Fish	Striped mullet	7
			Fish	Medaka	Comp 8,8a
			Fish	Tilapia	9
			Fish	Tilapia	9afd and 10a Comp
			Fish	Tilapia	10
			Shellfish	Rock crab	MSM-01
			Shellfish	Hawaiian prawn	MSM-02
	Background	Nanakuli Muliwai	Fish	Tilapia	12
			Fish	Tilapia	13
			Fish	Tilapia	14
			Shellfish	Hawaiian prawn	NM-01
			Shellfish	Hawaiian prawn	NM-01A
			Shellfish	Rock crab	NM-02
Nearshore	Site	Near shore - Makua	Fish	Sidespot goatfish	NW1
			Fish	Manybar goatfish	NW1fd
			Fish	Picasso triggerfish	NW2
			Fish	Blackspot sergeant	NW3
			Fish	Manybar goatfish	NW4
			Fish	Christmas wrasse	NW5
			Limu	Limu	NW1SW1-1
			Limu	Limu	NW1SW1-1fd
			Limu	Limu	NW1SW2-1
			Limu	Limu	NW1SW3-1
			Shellfish	Helmet urchin	MNS-03
			Shellfish	Kona crab	MNS-05
	Background	Near shore - Sandy Beach	Fish	Blackspot sergeant	NW2fd
			Fish	Christmas wrasse	NW6
			Fish	Saddle wrasse	NW7
			Fish	Blackspot sergeant	NW8
			Fish	Picasso triggerfish	NW9
			Fish	Manybar goatfish	NW10
			Shellfish	Helmet urchin	SBNS-01

Appendix D-1.3 Fish Tissue Summary Statistics

Area	Riskstats_v1.19_Parameter	Units	N	#D	%D	MinD	MaxD	Mean_Arith
Makua North and South Muliwai	1,2,3,4,6,7,8-hpcdd	mg/kg	12	1	8.33	5.31E-07	5.31E-07	7.62E-07
Makua North and South Muliwai	1,2,3,4,6,7,8-hpcdf	mg/kg	12	1	8.33	2.95E-07	2.95E-07	2.30E-07
Makua North and South Muliwai	1,2,3,7,8-pecdd	mg/kg	12	3	25	4.49E-07	1.76E-06	4.38E-07
Makua North and South Muliwai	2,3,7,8-tcdf	mg/kg	12	1	8.33	5.90E-07	5.90E-07	2.36E-07
Makua North and South Muliwai	4,4'-ddt	mg/kg	11	7	63.64	0.0005	0.0029	0.0011225
Makua North and South Muliwai	acetone	mg/kg	10	5	50	0.23	0.38	0.34518
Makua North and South Muliwai	aluminum	mg/kg	12	12	100	48.3	4240	2098
Makua North and South Muliwai	antimony	mg/kg	12	3	25	0.04	0.0527	0.02234
Makua North and South Muliwai	arsenic	mg/kg	12	12	100	1.46	29.8	4.5892
Makua North and South Muliwai	barium	mg/kg	12	12	100	5.53	26.1	18.369
Makua North and South Muliwai	beryllium	mg/kg	12	8	66.67	0.01	0.051	0.023475
Makua North and South Muliwai	bhc,beta	mg/kg	10	2	20	0.00081	0.0041	0.0012179
Makua North and South Muliwai	bhc,delta	mg/kg	10	1	10	0.00031	0.00031	0.00077912
Makua North and South Muliwai	bhc,gamma	mg/kg	10	4	40	0.00089	0.0017	0.0010165
Makua North and South Muliwai	bis(2-ethylhexyl)phthalate	mg/kg	12	1	8.33	3.1	3.1	0.34613
Makua North and South Muliwai	cadmium	mg/kg	12	12	100	0.02	0.147	0.052183
Makua North and South Muliwai	chromium	mg/kg	12	12	100	0.9	31.5	13.167
Makua North and South Muliwai	cobalt	mg/kg	12	12	100	0.397	4.17	2.4106
Makua North and South Muliwai	copper	mg/kg	12	12	100	6.39	166	51.387
Makua North and South Muliwai	di-n-butylphthalate	mg/kg	12	12	100	0.0098	1.5	0.21548
Makua North and South Muliwai	heptachlorepoxide	mg/kg	7	3	42.86	0.00051	0.00093	0.0013391
Makua North and South Muliwai	hpcdd,total	mg/kg	12	9	75	0.000000699	1.02E-05	2.30E-06
Makua North and South Muliwai	hpcdf,total	mg/kg	12	3	25	0.000000295	1.35E-06	3.59E-07
Makua North and South Muliwai	hxcdd,total	mg/kg	12	1	8.33	0.000000145	1.45E-07	1.38E-07
Makua North and South Muliwai	hxcdf,total	mg/kg	12	1	8.33	0.000000129	1.29E-07	7.80E-08
Makua North and South Muliwai	iron	mg/kg	12	12	100	122	4530	2707.5
Makua North and South Muliwai	lead	mg/kg	12	12	100	0.973	5.39	2.0952
Makua North and South Muliwai	lipids,total	percent	10	10	100	2.1	6.4	4.33
Makua North and South Muliwai	m,p-xylenes	mg/kg	12	2	16.67	0.0016	0.017	0.012746
Makua North and South Muliwai	manganese	mg/kg	12	12	100	11.9	386	180.98
Makua North and South Muliwai	mercury	mg/kg	12	12	100	0.024	0.103	0.055775
Makua North and South Muliwai	methylmercury	mg/kg	12	12	100	0.012	0.17	0.05744
Makua North and South Muliwai	ocdd	mg/kg	12	2	16.67	6.90E-06	8.70E-06	6.11E-06
Makua North and South Muliwai	ocdf	mg/kg	12	3	25	5.49E-07	1.31E-06	8.82E-07
Makua North and South Muliwai	pecdd,total	mg/kg	12	2	16.67	1.42E-06	1.76E-06	4.27E-07
Makua North and South Muliwai	percentlipids	percent	2	2	100	13.9	16	14.95

Appendix D-1.3 Fish Tissue Summary Statistics

Area	Riskstats_v1.19_Parameter	Units	N	#D	%D	MinD	MaxD	Mean_Arith
Makua North and South Muliwai	percentmoisture	mg/kg	14	14	100	0	72.9	0
Makua North and South Muliwai	perchlorate	mg/kg	12	7	58.33	0.0012	0.16	0.027167
Makua North and South Muliwai	selenium	mg/kg	12	12	100	1.61	3.71	2.4633
Makua North and South Muliwai	silver	mg/kg	12	12	100	0.014	1.13	0.36413
Makua North and South Muliwai	solids,total	percent	10	10	100	24.4	30.6	27.16
Makua North and South Muliwai	tcdf,total	mg/kg	12	1	8.33	5.90E-07	5.90E-07	1.20E-07
Makua North and South Muliwai	thallium	mg/kg	12	2	16.67	0.00325	0.00586	0.0060625
Makua North and South Muliwai	vanadium	mg/kg	12	12	100	1.24	19.3	11.943
Makua North and South Muliwai	zinc	mg/kg	12	12	100	85.2	201	114.09
Nanakuli Muliwai	1,2,3,4,6,7,8-hpcdf	mg/kg	3	3	100	0.000000178	0.000000371	2.52E-07
Nanakuli Muliwai	4,4'-ddt	mg/kg	3	2	66.67	0.0013	0.0014	0.00123
Nanakuli Muliwai	aluminum	mg/kg	3	3	100	3810	5170	4466.7
Nanakuli Muliwai	arsenic	mg/kg	3	3	100	2.51	2.57	2.54
Nanakuli Muliwai	barium	mg/kg	3	3	100	39.1	43.6	40.8
Nanakuli Muliwai	beryllium	mg/kg	3	3	100	0.078	0.094	0.084667
Nanakuli Muliwai	cadmium	mg/kg	3	3	100	0.11	0.13	0.12
Nanakuli Muliwai	chromium	mg/kg	3	3	100	19.7	24.7	22.233
Nanakuli Muliwai	cobalt	mg/kg	3	3	100	4.59	5.25	4.9
Nanakuli Muliwai	copper	mg/kg	3	3	100	64.9	79.9	71.6
Nanakuli Muliwai	di-n-butylphthalate	mg/kg	3	3	100	0.012	0.018	0.015333
Nanakuli Muliwai	heptachlorepoxide	mg/kg	2	2	100	0.00098	0.0011	0.00104
Nanakuli Muliwai	hpcdd,total	mg/kg	3	3	100	1.73E-06	2.46E-06	2.04E-06
Nanakuli Muliwai	hpcdf,total	mg/kg	3	3	100	1.78E-07	3.71E-07	2.52E-07
Nanakuli Muliwai	hxcdd,total	mg/kg	3	1	33.33	3.69E-07	3.69E-07	1.51E-07
Nanakuli Muliwai	hxcdf,total	mg/kg	3	1	33.33	1.67E-07	1.67E-07	8.11E-08
Nanakuli Muliwai	iron	mg/kg	3	3	100	5410	7010	5996.7
Nanakuli Muliwai	lead	mg/kg	3	3	100	2.01	2.15	2.06
Nanakuli Muliwai	lipids,total	percent	3	3	100	3.3	4.8	3.9667
Nanakuli Muliwai	manganese	mg/kg	3	3	100	501	611	571.67
Nanakuli Muliwai	mercury	mg/kg	3	3	100	0.042	0.047	0.044
Nanakuli Muliwai	methylmercury	mg/kg	3	3	100	0.032	0.053	0.039333
Nanakuli Muliwai	ocdf	mg/kg	3	3	100	0.000000644	0.000000878	7.2367E-07
Nanakuli Muliwai	perchlorate	mg/kg	3	1	33.33	0.0014	0.0014	0.00056095
Nanakuli Muliwai	selenium	mg/kg	3	3	100	2.19	2.57	2.3833
Nanakuli Muliwai	silver	mg/kg	3	3	100	0.527	0.703	0.608
Nanakuli Muliwai	solids,total	percent	3	3	100	27.3	28.7	28.067

Appendix D-1.3 Fish Tissue Summary Statistics

Area	Riskstats_v1.19_Parameter	Units	N	#D	%D	MinD	MaxD	Mean_Arith
Nanakuli Muliwai	vanadium	mg/kg	3	3	100	19.6	23.6	20.967
Nanakuli Muliwai	zinc	mg/kg	3	3	100	108	116	111.67
Makua North Muliwai	1,2,3,7,8-pecdd	mg/kg	5	2	40	4.49E-07	1.42E-06	4.01E-07
Makua North Muliwai	4,4'-ddt	mg/kg	4	2	50	0.0005	0.00074	0.00050445
Makua North Muliwai	acetone	mg/kg	5	1	20	0.25	0.25	0.43184
Makua North Muliwai	aluminum	mg/kg	5	5	100	48.3	4240	2415.7
Makua North Muliwai	antimony	mg/kg	5	1	20	0.04	0.04	0.019314
Makua North Muliwai	arsenic	mg/kg	5	5	100	2.25	3.81	2.928
Makua North Muliwai	barium	mg/kg	5	5	100	5.53	26.1	20.786
Makua North Muliwai	beryllium	mg/kg	5	4	80	0.028	0.051	0.0303
Makua North Muliwai	bhc,delta	mg/kg	4	1	25	0.00031	0.00031	0.00028256
Makua North Muliwai	bhc,gamma	mg/kg	4	2	50	0.00089	0.0013	0.00090105
Makua North Muliwai	cadmium	mg/kg	5	5	100	0.02	0.08	0.054
Makua North Muliwai	chromium	mg/kg	5	5	100	0.9	14.7	9.24
Makua North Muliwai	cobalt	mg/kg	5	5	100	0.397	4.17	2.6134
Makua North Muliwai	copper	mg/kg	5	5	100	6.39	166	62.118
Makua North Muliwai	di-n-butylphthalate	mg/kg	5	5	100	0.0098	0.015	0.01136
Makua North Muliwai	heptachlorepoxide	mg/kg	2	1	50	0.00051	0.00051	0.00085604
Makua North Muliwai	hpcdd,total	mg/kg	5	5	100	1.40E-06	1.02E-05	3.55E-06
Makua North Muliwai	hpcdf,total	mg/kg	5	1	20	7.99E-07	7.99E-07	2.09E-07
Makua North Muliwai	iron	mg/kg	5	5	100	122	4530	2612.4
Makua North Muliwai	lead	mg/kg	5	5	100	1.25	5.39	2.636
Makua North Muliwai	lipids,total	percent	5	5	100	2.1	6.4	4.42
Makua North Muliwai	manganese	mg/kg	5	5	100	11.9	386	244.78
Makua North Muliwai	mercury	mg/kg	5	5	100	0.024	0.074	0.039
Makua North Muliwai	methylmercury	mg/kg	5	5	100	0.012	0.07	0.0334
Makua North Muliwai	pecdd,total	mg/kg	5	1	20	1.42E-06	1.42E-06	3.18E-07
Makua North Muliwai	percentmoisture	ug/l	5	5	100	0	0	0
Makua North Muliwai	perchlorate	mg/kg	5	1	20	0.0019	0.0019	0.00049314
Makua North Muliwai	selenium	mg/kg	5	5	100	1.83	3.71	2.382
Makua North Muliwai	silver	mg/kg	5	5	100	0.014	1.13	0.3952
Makua North Muliwai	solids,total	percent	5	5	100	24.4	28.1	26.74
Makua North Muliwai	vanadium	mg/kg	5	5	100	1.24	19.3	12.808
Makua North Muliwai	zinc	mg/kg	5	5	100	98.8	129	113.96
Makua South Muliwai	1,2,3,4,6,7,8-hpcdd	mg/kg	7	1	14.29	5.31E-07	5.31E-07	7.53E-07
Makua South Muliwai	1,2,3,4,6,7,8-hpcdf	mg/kg	7	1	14.29	2.95E-07	2.95E-07	3.50E-07

Appendix D-1.3 Fish Tissue Summary Statistics

Area	Riskstats_v1.19_Parameter	Units	N	#D	%D	MinD	MaxD	Mean_Arith
Makua South Muliwai	1,2,3,7,8-pecdd	mg/kg	7	1	14.29	1.76E-06	1.76E-06	4.64E-07
Makua South Muliwai	2,3,7,8-tcdf	mg/kg	7	1	14.29	5.90E-07	5.90E-07	3.80E-07
Makua South Muliwai	4,4'-ddt	mg/kg	7	5	71.43	0.00067	0.0029	0.0014757
Makua South Muliwai	acetone	mg/kg	5	4	80	0.23	0.38	0.25853
Makua South Muliwai	aluminum	mg/kg	7	7	100	1150	2880	1871.1
Makua South Muliwai	antimony	mg/kg	7	2	28.57	0.0481	0.0527	0.024502
Makua South Muliwai	arsenic	mg/kg	7	7	100	1.46	29.8	5.7757
Makua South Muliwai	barium	mg/kg	7	7	100	12.5	21.2	16.643
Makua South Muliwai	beryllium	mg/kg	7	4	57.14	0.01	0.032	0.018511
Makua South Muliwai	bhc,beta	mg/kg	7	2	28.57	0.00081	0.0041	0.0015742
Makua South Muliwai	bhc,gamma	mg/kg	6	2	33.33	0.0016	0.0017	0.0014162
Makua South Muliwai	bis(2-ethylhexyl)phthalate	mg/kg	7	1	14.29	3.1	3.1	0.56862
Makua South Muliwai	cadmium	mg/kg	7	7	100	0.02	0.147	0.050886
Makua South Muliwai	chromium	mg/kg	7	7	100	8.4	31.5	15.971
Makua South Muliwai	cobalt	mg/kg	7	7	100	1.94	2.58	2.2657
Makua South Muliwai	copper	mg/kg	7	7	100	9.56	109	43.723
Makua South Muliwai	di-n-butylphthalate	mg/kg	7	7	100	0.011	1.5	0.36129
Makua South Muliwai	heptachlorepoxide	mg/kg	5	2	40	0.00058	0.00093	0.0015324
Makua South Muliwai	hpcdd,total	mg/kg	7	4	57.14	6.99E-07	3.02E-06	1.41E-06
Makua South Muliwai	hpcdf,total	mg/kg	7	2	28.57	2.95E-07	1.35E-06	4.66E-07
Makua South Muliwai	hxcdd,total	mg/kg	7	1	14.29	1.45E-07	1.45E-07	2.11E-07
Makua South Muliwai	hxcdf,total	mg/kg	7	1	14.29	1.29E-07	1.29E-07	1.57E-07
Makua South Muliwai	iron	mg/kg	7	7	100	1900	3460	2775.4
Makua South Muliwai	lead	mg/kg	7	7	100	0.973	2.61	1.709
Makua South Muliwai	lipids,total	percent	5	5	100	2.5	6.4	4.24
Makua South Muliwai	m,p-xylenes	mg/kg	7	2	28.57	0.0016	0.017	0.012254
Makua South Muliwai	manganese	mg/kg	7	7	100	94.9	184	135.41
Makua South Muliwai	mercury	mg/kg	7	7	100	0.034	0.103	0.067757
Makua South Muliwai	methylmercury	mg/kg	7	7	100	0.038	0.17	0.074612
Makua South Muliwai	ocdd	mg/kg	7	2	28.57	6.90E-06	8.70E-06	5.44E-06
Makua South Muliwai	ocdf	mg/kg	7	3	42.86	5.49E-07	1.31E-06	8.30E-07
Makua South Muliwai	pecdd,total	mg/kg	7	1	14.29	1.76E-06	1.76E-06	5.05E-07
Makua South Muliwai	percentlipids	percent	2	2	100	13.9	16	14.95
Makua South Muliwai	percentmoisture	mg/kg	9	9	100	0	72.9	0
Makua South Muliwai	perchlorate	mg/kg	7	6	85.71	0.0012	0.16	0.04622
Makua South Muliwai	selenium	mg/kg	7	7	100	1.61	3.59	2.5214

Appendix D-1.3 Fish Tissue Summary Statistics

Area	Riskstats_v1.19_Parameter	Units	N	#D	%D	MinD	MaxD	Mean_Arith
Makua South Muliwai	silver	mg/kg	7	7	100	0.046	0.822	0.34194
Makua South Muliwai	solids,total	percent	5	5	100	25.7	30.6	27.58
Makua South Muliwai	tcdf,total	mg/kg	7	1	14.29	5.90E-07	5.90E-07	1.7924E-07
Makua South Muliwai	thallium	mg/kg	7	2	28.57	0.00325	0.00586	0.0058471
Makua South Muliwai	vanadium	mg/kg	7	7	100	7.76	18.2	11.326
Makua South Muliwai	zinc	mg/kg	7	7	100	85.2	201	114.19
Sandy Beach	1,2,3,7,8-pecdd	mg/kg	6	1	16.67	0.000000172	0.000000172	1.9413E-07
Sandy Beach	4,4'-ddt	mg/kg	6	2	33.33	0.0019	0.0021	0.00098958
Sandy Beach	acetone	mg/kg	5	4	80	0.23	0.6	0.33384
Sandy Beach	aldrin	mg/kg	6	1	16.67	0.0064	0.0064	0.0026694
Sandy Beach	aluminum	mg/kg	6	6	100	3.8	4720	796
Sandy Beach	antimony	mg/kg	6	1	16.67	0.0259	0.0259	0.016102
Sandy Beach	arsenic	mg/kg	6	6	100	4.52	53	18.673
Sandy Beach	barium	mg/kg	6	6	100	0.96	14.2	5.6483
Sandy Beach	beryllium	mg/kg	6	1	16.67	0.069	0.069	0.013503
Sandy Beach	bhc,gamma	mg/kg	5	1	20	0.0019	0.0019	0.003859
Sandy Beach	bis(2-ethylhexyl)phthalate	mg/kg	6	1	16.67	0.049	0.049	0.056014
Sandy Beach	cadmium	mg/kg	6	6	100	0.04	0.2	0.10867
Sandy Beach	chromium	mg/kg	6	6	100	0.7	31.7	7.2817
Sandy Beach	cobalt	mg/kg	6	6	100	0.109	4.31	0.8315
Sandy Beach	copper	mg/kg	6	6	100	1.86	16.5	4.7767
Sandy Beach	diethylphthalate	mg/kg	6	2	33.33	0.018	0.019	0.03669
Sandy Beach	di-n-butylphthalate	mg/kg	6	6	100	0.014	0.61	0.13417
Sandy Beach	heptachlor	mg/kg	6	2	33.33	0.0045	0.0057	0.0029315
Sandy Beach	heptachlorepoxide	mg/kg	5	3	60	0.0028	0.0076	0.0029628
Sandy Beach	hpcdd,total	mg/kg	6	4	66.67	3.06E-07	1.62E-06	5.77E-07
Sandy Beach	hpcdf,total	mg/kg	6	1	16.67	2.87E-07	2.87E-07	1.63E-07
Sandy Beach	iron	mg/kg	6	6	100	68.4	6960	1229.5
Sandy Beach	lead	mg/kg	6	6	100	0.463	2.75	1.4398
Sandy Beach	lipids,total	percent	5	5	100	1.7	9.1	4.04
Sandy Beach	m,p-xylenes	mg/kg	6	1	16.67	0.016	0.016	0.013863
Sandy Beach	manganese	mg/kg	6	6	100	1.4	147	28.39
Sandy Beach	mercury	mg/kg	6	5	83.33	0.024	0.043	0.027782
Sandy Beach	methylmercury	mg/kg	6	5	83.33	0.027	0.056	0.036351
Sandy Beach	percentlipids	percent	1	1	100	9.09	9.09	9.09
Sandy Beach	perchlorate	mg/kg	6	2	33.33	0.01	0.11	0.020094

Appendix D-1.3 Fish Tissue Summary Statistics

Area	Riskstats_v1.19_Parameter	Units	N	#D	%D	MinD	MaxD	Mean_Arith
Sandy Beach	selenium	mg/kg	6	4	66.67	0.879	1.8	0.99506
Sandy Beach	silver	mg/kg	6	1	16.67	0.031	0.031	0.010116
Sandy Beach	solids,total	percent	5	5	100	26.5	31.8	28.82
Sandy Beach	tcdf,total	mg/kg	6	1	16.67	2.47E-07	2.47E-07	1.32E-07
Sandy Beach	thallium	mg/kg	6	1	16.67	0.0126	0.0126	0.007639
Sandy Beach	vanadium	mg/kg	6	6	100	0.312	20.3	3.8153
Sandy Beach	zinc	mg/kg	6	6	100	44.7	77	66.417
Nearshore @ Makua	4,4'-ddt	mg/kg	5	1	20	0.00018	0.00018	0.00049138
Nearshore @ Makua	acetone	mg/kg	4	3	75	0.27	0.73	0.48407
Nearshore @ Makua	aldrin	mg/kg	5	2	40	0.0024	0.0027	0.0019675
Nearshore @ Makua	aluminum	mg/kg	5	5	100	6.8	65	30.64
Nearshore @ Makua	arsenic	mg/kg	5	5	100	4.06	37.3	23.012
Nearshore @ Makua	barium	mg/kg	5	5	100	0.46	31.6	6.984
Nearshore @ Makua	bhc,alpha	mg/kg	5	1	20	0.0082	0.0082	0.0020529
Nearshore @ Makua	bhc,delta	mg/kg	5	1	20	0.0003	0.0003	0.0011065
Nearshore @ Makua	bhc,gamma	mg/kg	4	1	25	0.0063	0.0063	0.0026692
Nearshore @ Makua	bis(2-ethylhexyl)phthalate	mg/kg	5	4	80	0.055	3.5	1.4039
Nearshore @ Makua	cadmium	mg/kg	5	5	100	0.12	0.21	0.151
Nearshore @ Makua	chromium	mg/kg	5	5	100	0.8	10.4	5.672
Nearshore @ Makua	cobalt	mg/kg	5	5	100	0.107	0.413	0.2306
Nearshore @ Makua	copper	mg/kg	5	5	100	2.2	9.78	4.21
Nearshore @ Makua	di-n-butylphthalate	mg/kg	5	5	100	0.022	1.4	0.3094
Nearshore @ Makua	heptachlor	mg/kg	4	1	25	0.0056	0.0056	0.0018685
Nearshore @ Makua	heptachlorepoxide	mg/kg	3	2	66.67	0.0032	0.014	0.0061105
Nearshore @ Makua	iron	mg/kg	5	5	100	62.5	302	163
Nearshore @ Makua	lead	mg/kg	5	5	100	0.076	2.01	0.6994
Nearshore @ Makua	lipids,total	percent	4	4	100	2.3	9.6	4.725
Nearshore @ Makua	m,p-xylenes	mg/kg	5	1	20	0.02	0.02	0.014748
Nearshore @ Makua	manganese	mg/kg	5	5	100	1.44	15.7	7.682
Nearshore @ Makua	mercury	mg/kg	5	5	100	0.044	0.0978	0.06436
Nearshore @ Makua	methylmercury	mg/kg	5	5	100	0.034	0.20009	0.084019
Nearshore @ Makua	nitroglycerin	mg/kg	5	1	20	0.33	0.33	0.17065
Nearshore @ Makua	percentlipids	percent	1	1	100	21.3	21.3	21.3
Nearshore @ Makua	percentmoisture	mg/kg	6	6	100	0	66.9	0
Nearshore @ Makua	perchlorate	mg/kg	6	1	16.67	0.0088	0.0088	0.0015845
Nearshore @ Makua	rdx	mg/kg	5	1	20	0.057	0.057	0.056655

Appendix D-1.3 Fish Tissue Summary Statistics

Area	Riskstats_v1.19_Parameter	Units	N	#D	%D	MinD	MaxD	Mean_Arith
Nearshore @ Makua	selenium	mg/kg	5	4	80	1.09	1.6	1.1577
Nearshore @ Makua	silver	mg/kg	5	4	80	0.008	0.0132	0.0093714
Nearshore @ Makua	solids,total	percent	5	5	100	27.6	34.2	30.6
Nearshore @ Makua	vanadium	mg/kg	5	5	100	0.106	1.24	0.6132
Nearshore @ Makua	zinc	mg/kg	5	5	100	36.8	149	74.54

Appendix D-1.4 Limu Tissue Summary Statistics

Area	Riskstats_v1.19_Parameter	Units	N	#D	%D	MinD	MaxD	Mean_Arith
Nearshore @ Makua	1,2,3,4,6,7,8-hpcdf	mg/kg	4	1	25	1.13E-06	1.13E-06	6.89E-07
Nearshore @ Makua	1,2,3,4,7,8-hxcdf	mg/kg	4	2	50	8.90E-08	1.14E-07	1.05E-07
Nearshore @ Makua	1,2,3,6,7,8-hxcdd	mg/kg	4	1	25	2.42E-07	2.42E-07	1.55E-07
Nearshore @ Makua	1,2,3,6,7,8-hxcdf	mg/kg	4	1	25	5.70E-08	5.70E-08	7.33E-08
Nearshore @ Makua	1,2,3,7,8,9-hxcdd	mg/kg	4	1	25	3.16E-07	3.16E-07	1.69E-07
Nearshore @ Makua	aluminum	mg/kg	4	4	100	58	1120	421.75
Nearshore @ Makua	antimony	mg/kg	4	3	75	0.04	0.145	0.062286
Nearshore @ Makua	arsenic	mg/kg	4	4	100	4.56	109	66.24
Nearshore @ Makua	barium	mg/kg	4	4	100	1.48	13.3	8.97
Nearshore @ Makua	beryllium	mg/kg	4	2	50	0.00559	0.02	0.0076349
Nearshore @ Makua	bis(2-ethylhexyl)phthalate	mg/kg	4	1	25	0.086	0.086	0.083018
Nearshore @ Makua	cadmium	mg/kg	4	4	100	0.17	0.28	0.24375
Nearshore @ Makua	chromium	mg/kg	4	3	75	0.8	6	2.1682
Nearshore @ Makua	cobalt	mg/kg	4	4	100	0.374	1.25	0.72175
Nearshore @ Makua	copper	mg/kg	4	4	100	0.85	4.57	2.6475
Nearshore @ Makua	di-n-butylphthalate	mg/kg	4	4	100	0.02	0.48	0.136
Nearshore @ Makua	heptachlor	mg/kg	4	3	75	0.00041	0.00072	0.001248
Nearshore @ Makua	hpcdd,total	mg/kg	4	3	75	3.23E-07	1.65E-05	4.59E-06
Nearshore @ Makua	hpcdf,total	mg/kg	4	2	50	1.76E-06	4.58E-06	1.66E-06
Nearshore @ Makua	hxcdd,total	mg/kg	4	1	25	1.91E-06	1.91E-06	5.73E-07
Nearshore @ Makua	hxcdf,total	mg/kg	4	2	50	8.90E-08	4.30E-07	1.90E-07
Nearshore @ Makua	iron	mg/kg	4	4	100	67.4	1860	670.6
Nearshore @ Makua	lead	mg/kg	4	4	100	0.529	3.88	1.521
Nearshore @ Makua	lipids,total	percent	3	1	33.33	0.079	0.079	0.049904
Nearshore @ Makua	m,p-xylenes	mg/kg	4	1	25	0.016	0.016	0.02044
Nearshore @ Makua	manganese	mg/kg	4	4	100	5.51	39	15.862
Nearshore @ Makua	ocdf	mg/kg	4	1	25	2.01E-06	2.01E-06	1.65E-06
Nearshore @ Makua	percentmoisture	mg/kg	5	5	100	0	75.4	0
Nearshore @ Makua	perchlorate	mg/kg	4	2	50	0.011	0.052	0.017217
Nearshore @ Makua	selenium	mg/kg	4	1	25	0.0743	0.0743	0.27844
Nearshore @ Makua	silver	mg/kg	4	4	100	0.029	0.141	0.072775
Nearshore @ Makua	solids,total	percent	3	3	100	11.6	18.8	16.167
Nearshore @ Makua	thallium	mg/kg	4	2	50	0.024	0.0268	0.016589
Nearshore @ Makua	vanadium	mg/kg	4	4	100	2.35	13.2	6.005

Nearshore @ Makua	zinc	mg/kg	4	4	100	8.9	12.3	10.585

Appendix D.1-5 Shellfish Tissue Summary Statistics

Area	Parameter	Units	Number of Samples	Number Detected	Percent Detected	Minimum Detected	Maximum Detected	Mean_Arithmetic
Makua North and South Muliwai	1,2,3,6,7,8-hxcdd	mg/kg	1	1	100	1.20E-06	1.20E-06	-
Makua North and South Muliwai	1,2,3,7,8,9-hxcdd	mg/kg	1	1	100	8.30E-07	8.30E-07	-
Makua North and South Muliwai	2,3,7,8-tcdf	mg/kg	1	1	100	1.70E-06	1.70E-06	-
Makua North and South Muliwai	ocdd	mg/kg	1	1	100	3.00E-06	3.00E-06	-
Makua North and South Muliwai	tcdd,total	mg/kg	1	1	100	3.30E-06	3.30E-06	-
Makua North and South Muliwai	tcdf,total	mg/kg	1	1	100	1.70E-06	1.70E-06	-
Makua North and South Muliwai	aluminum	mg/kg	2	2	100	33.3	143	88.15
Makua North and South Muliwai	arsenic	mg/kg	2	2	100	2.4	3.6	3
Makua North and South Muliwai	barium	mg/kg	2	2	100	26.3	57.8	42.05
Makua North and South Muliwai	chromium	mg/kg	2	2	100	0.94	1.3	1.12
Makua North and South Muliwai	cobalt	mg/kg	2	2	100	0.17	0.8	0.485
Makua North and South Muliwai	copper	mg/kg	2	2	100	21.3	39.7	30.5
Makua North and South Muliwai	iron	mg/kg	2	2	100	92.2	226	159.1
Makua North and South Muliwai	lead	mg/kg	2	1	50	0.16	0.16	-
Makua North and South Muliwai	manganese	mg/kg	2	2	100	70.3	122	96.15
Makua North and South Muliwai	selenium	mg/kg	2	2	100	0.68	1.2	0.94
Makua North and South Muliwai	vanadium	mg/kg	2	2	100	0.35	0.77	0.56
Makua North and South Muliwai	zinc	mg/kg	2	2	100	28.4	31.2	29.8
Makua North and South Muliwai	percentlipids	mg/kg	1	1	100	0.7	0.7	-
Makua North and South Muliwai	mercury	mg/kg	2	1	50	0.022	0.022	-
Makua North and South Muliwai	percentmoisture	mg/kg	3	3	100	55.9	71.3	61.267
Makua North Muliwai	1,2,3,6,7,8-hxcdd	mg/kg	1	1	100	1.20E-06	1.20E-06	-
Makua North Muliwai	1,2,3,7,8,9-hxcdd	mg/kg	1	1	100	8.30E-07	8.30E-07	-
Makua North Muliwai	2,3,7,8-tcdf	mg/kg	1	1	100	1.70E-06	1.70E-06	-
Makua North Muliwai	ocdd	mg/kg	1	1	100	3.00E-06	3.00E-06	-
Makua North Muliwai	tcdd,total	mg/kg	1	1	100	3.30E-06	3.30E-06	-
Makua North Muliwai	tcdf,total	mg/kg	1	1	100	1.70E-06	1.70E-06	-
Makua North Muliwai	aluminum	mg/kg	1	1	100	33.3	33.3	-
Makua North Muliwai	arsenic	mg/kg	1	1	100	2.4	2.4	-
Makua North Muliwai	barium	mg/kg	1	1	100	26.3	26.3	-
Makua North Muliwai	chromium	mg/kg	1	1	100	0.94	0.94	-
Makua North Muliwai	cobalt	mg/kg	1	1	100	0.17	0.17	-
Makua North Muliwai	copper	mg/kg	1	1	100	21.3	21.3	-
Makua North Muliwai	iron	mg/kg	1	1	100	92.2	92.2	-
Makua North Muliwai	manganese	mg/kg	1	1	100	70.3	70.3	-
Makua North Muliwai	selenium	mg/kg	1	1	100	0.68	0.68	-
Makua North Muliwai	vanadium	mg/kg	1	1	100	0.35	0.35	-

Appendix D.1-5 Shellfish Tissue Summary Statistics

Area	Parameter	Units	Number of Samples	Number Detected	Percent Detected	Minimum Detected	Maximum Detected	Mean_Arithmetic
Makua North Muliwai	zinc	mg/kg	1	1	100	31.2	31.2	-
Makua North Muliwai	percentlipids	mg/kg	1	1	100	0.7	0.7	-
Makua North Muliwai	mercury	mg/kg	1	1	100	0.022	0.022	-
Makua North Muliwai	percentmoisture	mg/kg	1	1	100	71.3	71.3	-
Makua South Muliwai	percentmoisture	mg/kg	2	2	100	55.9	56.6	56.25
Makua South Muliwai	aluminum	mg/kg	1	1	100	143	143	-
Makua South Muliwai	arsenic	mg/kg	1	1	100	3.6	3.6	-
Makua South Muliwai	barium	mg/kg	1	1	100	57.8	57.8	-
Makua South Muliwai	chromium	mg/kg	1	1	100	1.3	1.3	-
Makua South Muliwai	cobalt	mg/kg	1	1	100	0.8	0.8	-
Makua South Muliwai	copper	mg/kg	1	1	100	39.7	39.7	-
Makua South Muliwai	iron	mg/kg	1	1	100	226	226	-
Makua South Muliwai	lead	mg/kg	1	1	100	0.16	0.16	-
Makua South Muliwai	manganese	mg/kg	1	1	100	122	122	-
Makua South Muliwai	selenium	mg/kg	1	1	100	1.2	1.2	-
Makua South Muliwai	vanadium	mg/kg	1	1	100	0.77	0.77	-
Makua South Muliwai	zinc	mg/kg	1	1	100	28.4	28.4	-
Nanakuli Muliwai	1,2,3,4,6,7,8-hpcdd	mg/kg	2	1	50	1.20E-06	1.20E-06	-
Nanakuli Muliwai	1,2,3,6,7,8-hxcdf	mg/kg	2	1	50	2.20E-06	2.20E-06	-
Nanakuli Muliwai	1,2,3,6,7,8-hxcdd	mg/kg	2	1	50	5.00E-07	5.00E-07	-
Nanakuli Muliwai	2,3,7,8-tcdf	mg/kg	2	1	50	4.60E-07	4.60E-07	-
Nanakuli Muliwai	ocdd	mg/kg	2	1	50	7.10E-06	7.10E-06	-
Nanakuli Muliwai	tcdd,total	mg/kg	2	1	50	8.00E-08	8.00E-08	-
Nanakuli Muliwai	tcdf,total	mg/kg	2	2	100	2.30E-07	1.30E-06	7.65E-07
Nanakuli Muliwai	aluminum	mg/kg	2	2	100	39.7	73.2	56.45
Nanakuli Muliwai	arsenic	mg/kg	2	2	100	2.2	3.9	3.05
Nanakuli Muliwai	barium	mg/kg	2	2	100	4.1	14.5	9.3
Nanakuli Muliwai	chromium	mg/kg	2	2	100	1	1.2	1.1
Nanakuli Muliwai	cobalt	mg/kg	2	2	100	0.23	0.28	0.255
Nanakuli Muliwai	copper	mg/kg	2	2	100	31	65.7	48.35
Nanakuli Muliwai	iron	mg/kg	2	2	100	80.4	110	95.2
Nanakuli Muliwai	manganese	mg/kg	2	2	100	32.4	32.5	32.45
Nanakuli Muliwai	selenium	mg/kg	2	1	50	1.7	1.7	-
Nanakuli Muliwai	silver	mg/kg	2	2	100	0.12	0.24	0.18
Nanakuli Muliwai	vanadium	mg/kg	2	2	100	0.31	0.36	0.335
Nanakuli Muliwai	zinc	mg/kg	2	2	100	14.8	485	249.9
Nanakuli Muliwai	percentlipids	mg/kg	2	2	100	1.5	1.7	1.6

Appendix D.1-5 Shellfish Tissue Summary Statistics

Area	Parameter	Units	Number of Samples	Number Detected	Percent Detected	Minimum Detected	Maximum Detected	Mean_Arithmetic
Nanakuli Muliwai	percentmoisture	mg/kg	1	1	100	74.1	74.1	-

Appendix D.1-5 Shellfish Tissue Summary Statistics

Area	Parameter	Units	Number of Samples	Number Detected	Percent Detected	Minimum Detected	Maximum Detected	Mean_Arithmetic
Sandy Beach	toluene	mg/kg	3	1	33.33	8.90E-04	8.90E-04	-
Sandy Beach	1,2,3,4,6,7,8-hpcdd	mg/kg	3	1	33.33	7.40E-05	7.40E-05	-
Sandy Beach	1,2,3,4,7,8-hxcdf	mg/kg	3	1	33.33	3.20E-07	3.20E-07	-
Sandy Beach	1,2,3,6,7,8-hxcdf	mg/kg	3	1	33.33	2.30E-07	2.30E-07	-
Sandy Beach	1,2,3,7,8,9-hxcdf	mg/kg	3	1	33.33	2.30E-07	2.30E-07	-
Sandy Beach	2,3,7,8-tcdf	mg/kg	3	1	33.33	3.10E-07	3.10E-07	-
Sandy Beach	ocdd	mg/kg	3	2	66.67	1.20E-06	2.90E-04	1.46E-04
Sandy Beach	tcdd,total	mg/kg	2	1	50	1.90E-07	1.90E-07	-
Sandy Beach	tcdf,total	mg/kg	2	1	50	3.90E-07	3.90E-07	-
Sandy Beach	aluminum	mg/kg	3	3	100	39.4	61.8	50.7
Sandy Beach	arsenic	mg/kg	3	2	66.67	1.2	1.2	1.2
Sandy Beach	barium	mg/kg	3	3	100	1.3	1.6	1.4667
Sandy Beach	beryllium	mg/kg	3	1	33.33	0.062	0.062	-
Sandy Beach	chromium	mg/kg	3	3	100	0.92	1.2	1.0733
Sandy Beach	cobalt	mg/kg	3	3	100	0.14	0.45	0.25667
Sandy Beach	copper	mg/kg	3	3	100	1	1.9	1.3333
Sandy Beach	iron	mg/kg	3	3	100	50.8	100	78.133
Sandy Beach	lead	mg/kg	3	3	100	0.51	0.98	0.70667
Sandy Beach	manganese	mg/kg	3	3	100	1.3	1.8	1.5333
Sandy Beach	selenium	mg/kg	3	3	100	0.52	1.2	0.86333
Sandy Beach	vanadium	mg/kg	3	2	66.67	0.35	0.36	0.355
Sandy Beach	zinc	mg/kg	3	3	100	4.4	5.9	5.3667
Sandy Beach	percentlipids	mg/kg	3	3	100	0.77	2.7	1.89
Sandy Beach	percentmoisture	mg/kg	3	3	100	37.7	44.2	42
Sandy Beach	totalhxcdd	mg/kg	1	1	100	8.10E-06	8.10E-06	-
Sandy Beach	totalhpcdd	mg/kg	1	1	100	1.10E-04	1.10E-04	-
Nearshore @ Makua	toluene	mg/kg	3	1	33.33	0.0011	0.0011	-
Nearshore @ Makua	aldrin	mg/kg	3	1	33.33	0.0011	0.0011	-
Nearshore @ Makua	ocdd	mg/kg	3	2	66.67	2.10E-06	8.00E-06	5.05E-06
Nearshore @ Makua	tcdd,total	mg/kg	2	1	50	2.00E-06	2.00E-06	-
Nearshore @ Makua	tcdf,total	mg/kg	2	1	50	4.00E-07	4.00E-07	-
Nearshore @ Makua	aluminum	mg/kg	3	3	100	29.9	102	68.1
Nearshore @ Makua	arsenic	mg/kg	3	3	100	0.47	26.4	9.3567
Nearshore @ Makua	barium	mg/kg	3	3	100	1.1	2.3	1.6
Nearshore @ Makua	cadmium	mg/kg	3	1	33.33	2	2	-
Nearshore @ Makua	chromium	mg/kg	3	3	100	1.2	1.2	1.2
Nearshore @ Makua	cobalt	mg/kg	3	3	100	0.23	0.37	0.27667

Appendix D.1-5 Shellfish Tissue Summary Statistics

Area	Parameter	Units	Number of Samples	Number Detected	Percent Detected	Minimum Detected	Maximum Detected	Mean_Arithmetic
Nearshore @ Makua	copper	mg/kg	3	3	100	1.6	25.7	9.9667
Nearshore @ Makua	iron	mg/kg	3	3	100	47.2	131	87.7
Nearshore @ Makua	lead	mg/kg	3	2	66.67	0.13	0.33	0.23
Nearshore @ Makua	manganese	mg/kg	3	3	100	1.7	3.5	2.7667
Nearshore @ Makua	selenium	mg/kg	3	3	100	0.49	1.7	0.97333
Nearshore @ Makua	silver	mg/kg	3	1	33.33	0.15	0.15	-
Nearshore @ Makua	vanadium	mg/kg	3	2	66.67	0.31	0.56	0.435
Nearshore @ Makua	zinc	mg/kg	3	3	100	7.2	47.4	22.067
Nearshore @ Makua	percentlipids	mg/kg	3	3	100	0.97	2.1	1.4567
Nearshore @ Makua	mercury	mg/kg	3	1	33.33	0.041	0.041	-
Nearshore @ Makua	percentmoisture	mg/kg	3	3	100	40	61.5	49.867
Nearshore @ Makua	perchlorate	mg/kg	3	1	33.33	1.05	1.05	-

Appendix D-2.1 TCDD Equivalent Calculations for Fish Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
M1 (Makua North Muliwai)	1	1,2,3,4,6,7,8-HpCDD	U	7.23E-07		0
M1 (Makua North Muliwai)	1	1,2,3,4,6,7,8-HpCDF	U	6.80E-08		0
M1 (Makua North Muliwai)	1	1,2,3,4,7,8,9-HpCDF	U	9.30E-08		0
M1 (Makua North Muliwai)	1	1,2,3,4,7,8-HxCDD	U	4.30E-08		0
M1 (Makua North Muliwai)	1	1,2,3,4,7,8-HxCDF	U	5.60E-08		0
M1 (Makua North Muliwai)	1	1,2,3,6,7,8-HxCDD	U	3.70E-08		0
M1 (Makua North Muliwai)	1	1,2,3,6,7,8-HxCDF	U	5.30E-08		0
M1 (Makua North Muliwai)	1	1,2,3,7,8,9-HxCDD	U	4.00E-08		0
M1 (Makua North Muliwai)	1	1,2,3,7,8,9-HxCDF	U	7.10E-08		0
M1 (Makua North Muliwai)	1	1,2,3,7,8-PeCDD	U	6.10E-08		0
M1 (Makua North Muliwai)	1	1,2,3,7,8-PeCDF	U	4.10E-08		0
M1 (Makua North Muliwai)	1	2,3,4,6,7,8-HxCDF	U	5.90E-08		0
M1 (Makua North Muliwai)	1	2,3,4,7,8-PeCDF	U	4.00E-08		0
M1 (Makua North Muliwai)	1	2,3,7,8-TCDD	U	3.50E-08		0
M1 (Makua North Muliwai)	1	2,3,7,8-TCDF	U	5.50E-08		0
M1 (Makua North Muliwai)	1	OCDD	U	5.27E-06		0
M1 (Makua North Muliwai)	1	OCDF	U	1.51E-07		0
M1 (Makua North Muliwai)	1	**TCDD Equivalent**				0
M1 (Makua North and South M	1b	1,2,3,4,6,7,8-HpCDD	U	7.74E-07		0
M1 (Makua North and South M	1b	1,2,3,4,6,7,8-HpCDF	U	9.40E-08		0
M1 (Makua North and South M	1b	1,2,3,4,7,8,9-HpCDF	U	1.28E-07		0
M1 (Makua North and South M	1b	1,2,3,4,7,8-HxCDD	U	5.80E-08		0
M1 (Makua North and South M	1b	1,2,3,4,7,8-HxCDF	U	4.20E-08		0
M1 (Makua North and South M	1b	1,2,3,6,7,8-HxCDD	U	5.00E-08		0
M1 (Makua North and South M	1b	1,2,3,6,7,8-HxCDF	U	4.00E-08		0
M1 (Makua North and South M	1b	1,2,3,7,8,9-HxCDD	U	5.50E-08		0
M1 (Makua North and South M	1b	1,2,3,7,8,9-HxCDF	U	5.30E-08		0
M1 (Makua North and South M	1b	1,2,3,7,8-PeCDD	U	7.30E-08		0
M1 (Makua North and South M	1b	1,2,3,7,8-PeCDF	U	4.60E-08		0
M1 (Makua North and South M	1b	2,3,4,6,7,8-HxCDF	U	4.40E-08		0
M1 (Makua North and South M	1b	2,3,4,7,8-PeCDF	U	4.40E-08		0
M1 (Makua North and South M	1b	2,3,7,8-TCDD	U	3.60E-08		0
M1 (Makua North and South M	1b	2,3,7,8-TCDF	U	4.90E-08		0
M1 (Makua North and South M	1b	OCDD	U	7.48E-06		0
M1 (Makua North and South M	1b	OCDF	U	6.60E-07		0
M1 (Makua North Muliwai)	1b	**TCDD Equivalent**				0
M1 (Makua North Muliwai)	3	1,2,3,4,6,7,8-HpCDD	U	5.47E-07		0
M1 (Makua North Muliwai)	3	1,2,3,4,6,7,8-HpCDF	U	8.50E-08		0
M1 (Makua North Muliwai)	3	1,2,3,4,7,8,9-HpCDF	U	1.17E-07		0
M1 (Makua North Muliwai)	3	1,2,3,4,7,8-HxCDD	U	6.80E-08		0
M1 (Makua North Muliwai)	3	1,2,3,4,7,8-HxCDF	U	5.60E-08		0
M1 (Makua North Muliwai)	3	1,2,3,6,7,8-HxCDD	U	5.80E-08		0
M1 (Makua North Muliwai)	3	1,2,3,6,7,8-HxCDF	U	5.20E-08		0
M1 (Makua North Muliwai)	3	1,2,3,7,8,9-HxCDD	U	6.40E-08		0
M1 (Makua North Muliwai)	3	1,2,3,7,8,9-HxCDF	U	7.00E-08		0
M1 (Makua North Muliwai)	3	1,2,3,7,8-PeCDD	J	1.42E-06	1	1.42E-06
M1 (Makua North Muliwai)	3	1,2,3,7,8-PeCDF	U	4.10E-08		0
M1 (Makua North Muliwai)	3	2,3,4,6,7,8-HxCDF	U	5.80E-08		0
M1 (Makua North Muliwai)	3	2,3,4,7,8-PeCDF	U	4.00E-08		0
M1 (Makua North Muliwai)	3	2,3,7,8-TCDD	U	4.20E-08		0
M1 (Makua North Muliwai)	3	2,3,7,8-TCDF	U	4.70E-08		0
M1 (Makua North Muliwai)	3	OCDD	U	4.11E-06		0
M1 (Makua North Muliwai)	3	OCDF	U	1.09E-06		0
M1 (Makua North Muliwai)	3	**TCDD Equivalent**				1.4E-06

Appendix D-2.1 TCDD Equivalent Calculations for Fish Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
M1 (Makua North Muliwai)	4	1,2,3,4,6,7,8-HpCDD	U	2.39E-06		0
M1 (Makua North Muliwai)	4	1,2,3,4,6,7,8-HpCDF	U	8.70E-08		0
M1 (Makua North Muliwai)	4	1,2,3,4,7,8,9-HpCDF	U	1.19E-07		0
M1 (Makua North Muliwai)	4	1,2,3,4,7,8-HxCDD	U	6.70E-08		0
M1 (Makua North Muliwai)	4	1,2,3,4,7,8-HxCDF	U	5.10E-08		0
M1 (Makua North Muliwai)	4	1,2,3,6,7,8-HxCDD	U	5.80E-08		0
M1 (Makua North Muliwai)	4	1,2,3,6,7,8-HxCDF	U	4.80E-08		0
M1 (Makua North Muliwai)	4	1,2,3,7,8,9-HxCDD	U	6.30E-08		0
M1 (Makua North Muliwai)	4	1,2,3,7,8,9-HxCDF	U	6.40E-08		0
M1 (Makua North Muliwai)	4	1,2,3,7,8-PeCDD	J	4.49E-07	1	4.49E-07
M1 (Makua North Muliwai)	4	1,2,3,7,8-PeCDF	U	6.60E-08		0
M1 (Makua North Muliwai)	4	2,3,4,6,7,8-HxCDF	U	5.30E-08		0
M1 (Makua North Muliwai)	4	2,3,4,7,8-PeCDF	U	6.40E-08		0
M1 (Makua North Muliwai)	4	2,3,7,8-TCDD	U	3.30E-08		0
M1 (Makua North Muliwai)	4	2,3,7,8-TCDF	U	5.60E-08		0
M1 (Makua North Muliwai)	4	OCDD	U	2.42E-05		0
M1 (Makua North Muliwai)	4	OCDF	U	4.16E-06		0
M1 (Makua North Muliwai)	4	**TCDD Equivalent**				4.5E-07
M1 (Makua North Muliwai)	5	1,2,3,4,6,7,8-HpCDD	U	1.05E-06		0
M1 (Makua North Muliwai)	5	1,2,3,4,6,7,8-HpCDF	U	1.03E-07		0
M1 (Makua North Muliwai)	5	1,2,3,4,7,8,9-HpCDF	U	1.42E-07		0
M1 (Makua North Muliwai)	5	1,2,3,4,7,8-HxCDD	U	6.10E-08		0
M1 (Makua North Muliwai)	5	1,2,3,4,7,8-HxCDF	U	5.90E-08		0
M1 (Makua North Muliwai)	5	1,2,3,6,7,8-HxCDD	U	5.20E-08		0
M1 (Makua North Muliwai)	5	1,2,3,6,7,8-HxCDF	U	5.50E-08		0
M1 (Makua North Muliwai)	5	1,2,3,7,8,9-HxCDD	U	5.70E-08		0
M1 (Makua North Muliwai)	5	1,2,3,7,8,9-HxCDF	U	7.40E-08		0
M1 (Makua North Muliwai)	5	1,2,3,7,8-PeCDD	U	5.60E-08		0
M1 (Makua North Muliwai)	5	1,2,3,7,8-PeCDF	U	5.50E-08		0
M1 (Makua North Muliwai)	5	2,3,4,6,7,8-HxCDF	U	6.20E-08		0
M1 (Makua North Muliwai)	5	2,3,4,7,8-PeCDF	U	5.40E-08		0
M1 (Makua North Muliwai)	5	2,3,7,8-TCDD	U	4.20E-08		0
M1 (Makua North Muliwai)	5	2,3,7,8-TCDF	U	4.70E-08		0
M1 (Makua North Muliwai)	5	OCDD	U	8.80E-06		0
M1 (Makua North Muliwai)	5	OCDF	U	6.93E-07		0
M1 (Makua North Muliwai)	5	**TCDD Equivalent**				0
M2 (Makua South Muliwai)	10	1,2,3,4,6,7,8-HpCDD	U	6.99E-07		0
M2 (Makua South Muliwai)	10	1,2,3,4,6,7,8-HpCDF	U	8.20E-08		0
M2 (Makua South Muliwai)	10	1,2,3,4,7,8,9-HpCDF	U	1.15E-07		0
M2 (Makua South Muliwai)	10	1,2,3,4,7,8-HxCDD	U	6.50E-08		0
M2 (Makua South Muliwai)	10	1,2,3,4,7,8-HxCDF	U	3.20E-08		0
M2 (Makua South Muliwai)	10	1,2,3,6,7,8-HxCDD	U	6.30E-08		0
M2 (Makua South Muliwai)	10	1,2,3,6,7,8-HxCDF	U	3.40E-08		0
M2 (Makua South Muliwai)	10	1,2,3,7,8,9-HxCDD	U	6.20E-08		0
M2 (Makua South Muliwai)	10	1,2,3,7,8,9-HxCDF	U	4.20E-08		0
M2 (Makua South Muliwai)	10	1,2,3,7,8-PeCDD	U	6.00E-08		0
M2 (Makua South Muliwai)	10	1,2,3,7,8-PeCDF	U	4.50E-08		0
M2 (Makua South Muliwai)	10	2,3,4,6,7,8-HxCDF	U	3.60E-08		0
M2 (Makua South Muliwai)	10	2,3,4,7,8-PeCDF	U	4.40E-08		0
M2 (Makua South Muliwai)	10	2,3,7,8-TCDD	U	2.70E-08		0
M2 (Makua South Muliwai)	10	2,3,7,8-TCDF	U	9.76E-07		0
M2 (Makua South Muliwai)	10	OCDD	U	5.94E-06		0
M2 (Makua South Muliwai)	10	OCDF	J	5.49E-07	0.0001	5.49E-11
M2 (Makua South Muliwai)	10	**TCDD Equivalent**				5.5E-11

Appendix D-2.1 TCDD Equivalent Calculations for Fish Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
M2 (Makua South Muliwai)	2fd	1,2,3,4,6,7,8-HpCDD	U	1.70E-06		0
M2 (Makua South Muliwai)	2fd	1,2,3,4,6,7,8-HpCDF	U	1.30E-06		0
M2 (Makua South Muliwai)	2fd	1,2,3,4,7,8,9-HpCDF	U	4.30E-07		0
M2 (Makua South Muliwai)	2fd	1,2,3,4,7,8-HxCDD	U	5.40E-07		0
M2 (Makua South Muliwai)	2fd	1,2,3,4,7,8-HxCDF	U	5.10E-07		0
M2 (Makua South Muliwai)	2fd	1,2,3,6,7,8-HxCDD	U	5.20E-07		0
M2 (Makua South Muliwai)	2fd	1,2,3,6,7,8-HxCDF	U	3.70E-07		0
M2 (Makua South Muliwai)	2fd	1,2,3,7,8,9-HxCDD	U	5.10E-07		0
M2 (Makua South Muliwai)	2fd	1,2,3,7,8,9-HxCDF	U	4.50E-07		0
M2 (Makua South Muliwai)	2fd	1,2,3,7,8-PeCDD	U	7.90E-07		0
M2 (Makua South Muliwai)	2fd	1,2,3,7,8-PeCDF	U	4.90E-07		0
M2 (Makua South Muliwai)	2fd	2,3,4,6,7,8-HxCDF	U	4.10E-07		0
M2 (Makua South Muliwai)	2fd	2,3,4,7,8-PeCDF	U	4.90E-07		0
M2 (Makua South Muliwai)	2fd	2,3,7,8-TCDD	U	3.30E-07		0
M2 (Makua South Muliwai)	2fd	2,3,7,8-TCDF	J	5.90E-07	0.1	5.90E-08
M2 (Makua South Muliwai)	2fd	OCDD	J	8.70E-06	0.0001	8.70E-10
M2 (Makua South Muliwai)	2fd	OCDF	U	1.10E-06		0
M2 (Makua South Muliwai)	2fd	**TCDD Equivalent**				6.0E-08
M2 (Makua South Muliwai)	6	1,2,3,4,6,7,8-HpCDD	U	1.83E-07		0
M2 (Makua South Muliwai)	6	1,2,3,4,6,7,8-HpCDF	U	1.19E-07		0
M2 (Makua South Muliwai)	6	1,2,3,4,7,8,9-HpCDF	U	1.61E-07		0
M2 (Makua South Muliwai)	6	1,2,3,4,7,8-HxCDD	U	1.54E-07		0
M2 (Makua South Muliwai)	6	1,2,3,4,7,8-HxCDF	U	9.80E-08		0
M2 (Makua South Muliwai)	6	1,2,3,6,7,8-HxCDD	U	1.46E-07		0
M2 (Makua South Muliwai)	6	1,2,3,6,7,8-HxCDF	U	1.01E-07		0
M2 (Makua South Muliwai)	6	1,2,3,7,8,9-HxCDD	U	1.53E-07		0
M2 (Makua South Muliwai)	6	1,2,3,7,8,9-HxCDF	U	1.25E-07		0
M2 (Makua South Muliwai)	6	1,2,3,7,8-PeCDD	U	1.70E-07		0
M2 (Makua South Muliwai)	6	1,2,3,7,8-PeCDF	U	1.17E-07		0
M2 (Makua South Muliwai)	6	2,3,4,6,7,8-HxCDF	U	1.07E-07		0
M2 (Makua South Muliwai)	6	2,3,4,7,8-PeCDF	U	1.11E-07		0
M2 (Makua South Muliwai)	6	2,3,7,8-TCDD	U	3.66E-07		0
M2 (Makua South Muliwai)	6	2,3,7,8-TCDF	U	3.45E-07		0
M2 (Makua South Muliwai)	6	OCDD	U	2.00E-06		0
M2 (Makua South Muliwai)	6	OCDF	U	3.75E-07		0
M2 (Makua South Muliwai)	6	**TCDD Equivalent**				0
M2 (Makua South Muliwai)	7	1,2,3,4,6,7,8-HpCDD	J	5.31E-07	0.01	5.31E-09
M2 (Makua South Muliwai)	7	1,2,3,4,6,7,8-HpCDF	U	1.53E-07		0
M2 (Makua South Muliwai)	7	1,2,3,4,7,8,9-HpCDF	U	2.07E-07		0
M2 (Makua South Muliwai)	7	1,2,3,4,7,8-HxCDD	U	4.81E-07		0
M2 (Makua South Muliwai)	7	1,2,3,4,7,8-HxCDF	U	2.68E-07		0
M2 (Makua South Muliwai)	7	1,2,3,6,7,8-HxCDD	U	4.58E-07		0
M2 (Makua South Muliwai)	7	1,2,3,6,7,8-HxCDF	U	2.74E-07		0
M2 (Makua South Muliwai)	7	1,2,3,7,8,9-HxCDD	U	4.78E-07		0
M2 (Makua South Muliwai)	7	1,2,3,7,8,9-HxCDF	U	3.41E-07		0
M2 (Makua South Muliwai)	7	1,2,3,7,8-PeCDD	U	2.43E-07		0
M2 (Makua South Muliwai)	7	1,2,3,7,8-PeCDF	U	9.80E-08		0
M2 (Makua South Muliwai)	7	2,3,4,6,7,8-HxCDF	U	2.90E-07		0
M2 (Makua South Muliwai)	7	2,3,4,7,8-PeCDF	U	9.40E-08		0
M2 (Makua South Muliwai)	7	2,3,7,8-TCDD	U	2.40E-07		0
M2 (Makua South Muliwai)	7	2,3,7,8-TCDF	U	2.21E-07		0
M2 (Makua South Muliwai)	7	OCDD	U	4.85E-06		0
M2 (Makua South Muliwai)	7	OCDF	J	1.31E-06	0.0001	1.31E-10
M2 (Makua South Muliwai)	7	**TCDD Equivalent**				5.4E-09

Appendix D-2.1 TCDD Equivalent Calculations for Fish Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
M2 (Makua South Muliwai)	9	1,2,3,4,6,7,8-HpCDD	U	9.82E-07		0
M2 (Makua South Muliwai)	9	1,2,3,4,6,7,8-HpCDF	J	2.95E-07	0.01	2.95E-09
M2 (Makua South Muliwai)	9	1,2,3,4,7,8,9-HpCDF	U	1.14E-07		0
M2 (Makua South Muliwai)	9	1,2,3,4,7,8-HxCDD	U	5.30E-08		0
M2 (Makua South Muliwai)	9	1,2,3,4,7,8-HxCDF	U	4.60E-08		0
M2 (Makua South Muliwai)	9	1,2,3,6,7,8-HxCDD	U	5.10E-08		0
M2 (Makua South Muliwai)	9	1,2,3,6,7,8-HxCDF	U	4.80E-08		0
M2 (Makua South Muliwai)	9	1,2,3,7,8,9-HxCDD	U	5.00E-08		0
M2 (Makua South Muliwai)	9	1,2,3,7,8,9-HxCDF	U	6.00E-08		0
M2 (Makua South Muliwai)	9	1,2,3,7,8-PeCDD	J	1.76E-06	1	1.76E-06
M2 (Makua South Muliwai)	9	1,2,3,7,8-PeCDF	U	3.00E-08		0
M2 (Makua South Muliwai)	9	2,3,4,6,7,8-HxCDF	U	5.20E-08		0
M2 (Makua South Muliwai)	9	2,3,4,7,8-PeCDF	U	2.80E-08		0
M2 (Makua South Muliwai)	9	2,3,7,8-TCDD	U	3.10E-08		0
M2 (Makua South Muliwai)	9	2,3,7,8-TCDF	U	1.09E-06		0
M2 (Makua South Muliwai)	9	OCDD	U	6.61E-06		0
M2 (Makua South Muliwai)	9	OCDF	J	1.26E-06	0.0001	1.26E-10
M2 (Makua South Muliwai)	9	**TCDD Equivalent**				1.8E-06
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,4,6,7,8-HpCDD	U	1.50E-06		0
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,4,6,7,8-HpCDF	U	6.30E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,4,7,8,9-HpCDF	U	4.90E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,4,7,8-HxCDD	U	6.30E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,4,7,8-HxCDF	U	3.40E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,6,7,8-HxCDD	U	6.10E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,6,7,8-HxCDF	U	3.20E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,7,8,9-HxCDD	U	5.80E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,7,8,9-HxCDF	U	4.00E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,7,8-PeCDD	U	7.90E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	1,2,3,7,8-PeCDF	U	6.10E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	2,3,4,6,7,8-HxCDF	U	3.60E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	2,3,4,7,8-PeCDF	U	6.00E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	2,3,7,8-TCDD	U	3.90E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	2,3,7,8-TCDF	U	2.60E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	OCDD	J	6.90E-06	0.0001	6.90E-10
M2 (Makua South Muliwai)	9afd and 10a Comp	OCDF	U	8.20E-07		0
M2 (Makua South Muliwai)	9afd and 10a Comp	**TCDD Equivalent**				6.9E-10
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,4,6,7,8-HpCDD	U	1.64E-06		0
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,4,6,7,8-HpCDF	U	7.66E-07		0
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,4,7,8,9-HpCDF	U	1.08E-07		0
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,4,7,8-HxCDD	U	5.20E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,4,7,8-HxCDF	U	3.10E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,6,7,8-HxCDD	U	5.00E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,6,7,8-HxCDF	U	3.20E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,7,8,9-HxCDD	U	5.00E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,7,8,9-HxCDF	U	3.90E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,7,8-PeCDD	U	5.00E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	1,2,3,7,8-PeCDF	U	3.50E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	2,3,4,6,7,8-HxCDF	U	3.40E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	2,3,4,7,8-PeCDF	U	3.40E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	2,3,7,8-TCDD	U	1.60E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	2,3,7,8-TCDF	U	3.20E-08		0
M2 (Makua South Muliwai)	Comp 8,8a	OCDD	U	1.24E-05		0
M2 (Makua South Muliwai)	Comp 8,8a	OCDF	U	1.51E-06		0
M2 (Makua South Muliwai)	Comp 8,8a	**TCDD Equivalent**				0

Appendix D-2.1 TCDD Equivalent Calculations for Fish Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
M3 (Nanakuli Muliwai)	12	1,2,3,4,6,7,8-HpCDD	U	8.62E-07		0
M3 (Nanakuli Muliwai)	12	1,2,3,4,6,7,8-HpCDF	J	2.07E-07	0.01	2.07E-09
M3 (Nanakuli Muliwai)	12	1,2,3,4,7,8,9-HpCDF	U	1.23E-07		0
M3 (Nanakuli Muliwai)	12	1,2,3,4,7,8-HxCDD	U	6.80E-08		0
M3 (Nanakuli Muliwai)	12	1,2,3,4,7,8-HxCDF	U	5.30E-08		0
M3 (Nanakuli Muliwai)	12	1,2,3,6,7,8-HxCDD	U	6.60E-08		0
M3 (Nanakuli Muliwai)	12	1,2,3,6,7,8-HxCDF	U	5.50E-08		0
M3 (Nanakuli Muliwai)	12	1,2,3,7,8,9-HxCDD	U	6.50E-08		0
M3 (Nanakuli Muliwai)	12	1,2,3,7,8,9-HxCDF	U	6.80E-08		0
M3 (Nanakuli Muliwai)	12	1,2,3,7,8-PeCDD	U	6.10E-08		0
M3 (Nanakuli Muliwai)	12	1,2,3,7,8-PeCDF	U	4.60E-08		0
M3 (Nanakuli Muliwai)	12	2,3,4,6,7,8-HxCDF	U	5.90E-08		0
M3 (Nanakuli Muliwai)	12	2,3,4,7,8-PeCDF	U	4.40E-08		0
M3 (Nanakuli Muliwai)	12	2,3,7,8-TCDD	U	2.40E-08		0
M3 (Nanakuli Muliwai)	12	2,3,7,8-TCDF	U	4.50E-08		0
M3 (Nanakuli Muliwai)	12	OCDD	U	6.19E-06		0
M3 (Nanakuli Muliwai)	12	OCDF	J	6.49E-07	0.0001	6.49E-11
M3 (Nanakuli Muliwai)	12	**TCDD Equivalent**				2.1E-09
M3 (Nanakuli Muliwai)	13	1,2,3,4,6,7,8-HpCDD	U	8.96E-07		0
M3 (Nanakuli Muliwai)	13	1,2,3,4,6,7,8-HpCDF	J	1.78E-07	0.01	1.78E-09
M3 (Nanakuli Muliwai)	13	1,2,3,4,7,8,9-HpCDF	U	1.38E-07		0
M3 (Nanakuli Muliwai)	13	1,2,3,4,7,8-HxCDD	U	5.60E-08		0
M3 (Nanakuli Muliwai)	13	1,2,3,4,7,8-HxCDF	U	5.00E-08		0
M3 (Nanakuli Muliwai)	13	1,2,3,6,7,8-HxCDD	U	5.40E-08		0
M3 (Nanakuli Muliwai)	13	1,2,3,6,7,8-HxCDF	U	5.30E-08		0
M3 (Nanakuli Muliwai)	13	1,2,3,7,8,9-HxCDD	U	5.30E-08		0
M3 (Nanakuli Muliwai)	13	1,2,3,7,8,9-HxCDF	U	6.50E-08		0
M3 (Nanakuli Muliwai)	13	1,2,3,7,8-PeCDD	U	5.30E-08		0
M3 (Nanakuli Muliwai)	13	1,2,3,7,8-PeCDF	U	2.60E-08		0
M3 (Nanakuli Muliwai)	13	2,3,4,6,7,8-HxCDF	U	5.60E-08		0
M3 (Nanakuli Muliwai)	13	2,3,4,7,8-PeCDF	U	2.50E-08		0
M3 (Nanakuli Muliwai)	13	2,3,7,8-TCDD	U	3.30E-08		0
M3 (Nanakuli Muliwai)	13	2,3,7,8-TCDF	U	5.80E-08		0
M3 (Nanakuli Muliwai)	13	OCDD	U	6.76E-06		0
M3 (Nanakuli Muliwai)	13	OCDF	J	6.44E-07	0.0001	6.44E-11
M3 (Nanakuli Muliwai)	13	**TCDD Equivalent**				1.8E-09
M3 (Nanakuli Muliwai)	14	1,2,3,4,6,7,8-HpCDD	U	1.19E-06		0
M3 (Nanakuli Muliwai)	14	1,2,3,4,6,7,8-HpCDF	J	3.71E-07	0.01	3.71E-09
M3 (Nanakuli Muliwai)	14	1,2,3,4,7,8,9-HpCDF	U	1.26E-07		0
M3 (Nanakuli Muliwai)	14	1,2,3,4,7,8-HxCDD	U	5.20E-08		0
M3 (Nanakuli Muliwai)	14	1,2,3,4,7,8-HxCDF	U	3.80E-08		0
M3 (Nanakuli Muliwai)	14	1,2,3,6,7,8-HxCDD	U	5.00E-08		0
M3 (Nanakuli Muliwai)	14	1,2,3,6,7,8-HxCDF	U	4.00E-08		0
M3 (Nanakuli Muliwai)	14	1,2,3,7,8,9-HxCDD	U	4.90E-08		0
M3 (Nanakuli Muliwai)	14	1,2,3,7,8,9-HxCDF	U	4.90E-08		0
M3 (Nanakuli Muliwai)	14	1,2,3,7,8-PeCDD	U	6.10E-08		0
M3 (Nanakuli Muliwai)	14	1,2,3,7,8-PeCDF	U	4.00E-08		0
M3 (Nanakuli Muliwai)	14	2,3,4,6,7,8-HxCDF	U	4.20E-08		0
M3 (Nanakuli Muliwai)	14	2,3,4,7,8-PeCDF	U	3.90E-08		0
M3 (Nanakuli Muliwai)	14	2,3,7,8-TCDD	U	3.40E-08		0
M3 (Nanakuli Muliwai)	14	2,3,7,8-TCDF	U	3.80E-08		0
M3 (Nanakuli Muliwai)	14	OCDD	U	9.25E-06		0
M3 (Nanakuli Muliwai)	14	OCDF	J	8.78E-07	0.0001	8.78E-11
M3 (Nanakuli Muliwai)	14	**TCDD Equivalent**				3.8E-09

Appendix D-2.1 TCDD Equivalent Calculations for Fish Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,4,6,7,8-HpCDD	U	8.20E-07		0
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,4,6,7,8-HpCDF	U	1.20E-06		0
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,4,7,8,9-HpCDF	U	4.40E-07		0
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,4,7,8-HxCDD	U	4.60E-07		0
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,4,7,8-HxCDF	U	3.60E-07		0
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,6,7,8-HxCDD	U	4.40E-07		0
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,6,7,8-HxCDF	U	3.40E-07		0
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,7,8,9-HxCDD	U	4.30E-07		0
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,7,8,9-HxCDF	U	4.10E-07		0
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,7,8-PeCDD	U	7.70E-07		0
NW1 (Nearshore @ Makua)	NW1fd	1,2,3,7,8-PeCDF	U	5.10E-07		0
NW1 (Nearshore @ Makua)	NW1fd	2,3,4,6,7,8-HxCDF	U	3.70E-07		0
NW1 (Nearshore @ Makua)	NW1fd	2,3,4,7,8-PeCDF	U	5.10E-07		0
NW1 (Nearshore @ Makua)	NW1fd	2,3,7,8-TCDD	U	4.10E-07		0
NW1 (Nearshore @ Makua)	NW1fd	2,3,7,8-TCDF	U	4.10E-07		0
NW1 (Nearshore @ Makua)	NW1fd	OCDD	U	3.30E-06		0
NW1 (Nearshore @ Makua)	NW1fd	OCDF	U	8.70E-07		0
NW1 (Nearshore @ Makua)	NW1fd	**TCDD Equivalent**				0
NW1 (Nearshore @ Makua)	NW2	1,2,3,4,6,7,8-HpCDD	U	1.58E-07		0
NW1 (Nearshore @ Makua)	NW2	1,2,3,4,6,7,8-HpCDF	U	9.20E-08		0
NW1 (Nearshore @ Makua)	NW2	1,2,3,4,7,8,9-HpCDF	U	1.29E-07		0
NW1 (Nearshore @ Makua)	NW2	1,2,3,4,7,8-HxCDD	U	7.90E-08		0
NW1 (Nearshore @ Makua)	NW2	1,2,3,4,7,8-HxCDF	U	4.30E-08		0
NW1 (Nearshore @ Makua)	NW2	1,2,3,6,7,8-HxCDD	U	7.60E-08		0
NW1 (Nearshore @ Makua)	NW2	1,2,3,6,7,8-HxCDF	U	4.50E-08		0
NW1 (Nearshore @ Makua)	NW2	1,2,3,7,8,9-HxCDD	U	7.50E-08		0
NW1 (Nearshore @ Makua)	NW2	1,2,3,7,8,9-HxCDF	U	5.50E-08		0
NW1 (Nearshore @ Makua)	NW2	1,2,3,7,8-PeCDD	U	5.70E-08		0
NW1 (Nearshore @ Makua)	NW2	1,2,3,7,8-PeCDF	U	4.50E-08		0
NW1 (Nearshore @ Makua)	NW2	2,3,4,6,7,8-HxCDF	U	4.80E-08		0
NW1 (Nearshore @ Makua)	NW2	2,3,4,7,8-PeCDF	U	4.30E-08		0
NW1 (Nearshore @ Makua)	NW2	2,3,7,8-TCDD	U	3.00E-08		0
NW1 (Nearshore @ Makua)	NW2	2,3,7,8-TCDF	U	5.70E-08		0
NW1 (Nearshore @ Makua)	NW2	OCDD	U	1.20E-06		0
NW1 (Nearshore @ Makua)	NW2	OCDF	U	1.96E-07		0
NW1 (Nearshore @ Makua)	NW2	**TCDD Equivalent**				0
NW1 (Nearshore @ Makua)	NW3	1,2,3,4,6,7,8-HpCDD	U	4.10E-08		0
NW1 (Nearshore @ Makua)	NW3	1,2,3,4,6,7,8-HpCDF	U	6.70E-08		0
NW1 (Nearshore @ Makua)	NW3	1,2,3,4,7,8,9-HpCDF	U	9.40E-08		0
NW1 (Nearshore @ Makua)	NW3	1,2,3,4,7,8-HxCDD	U	7.80E-08		0
NW1 (Nearshore @ Makua)	NW3	1,2,3,4,7,8-HxCDF	U	3.80E-08		0
NW1 (Nearshore @ Makua)	NW3	1,2,3,6,7,8-HxCDD	U	7.50E-08		0
NW1 (Nearshore @ Makua)	NW3	1,2,3,6,7,8-HxCDF	U	4.00E-08		0
NW1 (Nearshore @ Makua)	NW3	1,2,3,7,8,9-HxCDD	U	7.40E-08		0
NW1 (Nearshore @ Makua)	NW3	1,2,3,7,8,9-HxCDF	U	4.90E-08		0
NW1 (Nearshore @ Makua)	NW3	1,2,3,7,8-PeCDD	U	6.90E-08		0
NW1 (Nearshore @ Makua)	NW3	1,2,3,7,8-PeCDF	U	3.60E-08		0
NW1 (Nearshore @ Makua)	NW3	2,3,4,6,7,8-HxCDF	U	4.30E-08		0
NW1 (Nearshore @ Makua)	NW3	2,3,4,7,8-PeCDF	U	3.50E-08		0
NW1 (Nearshore @ Makua)	NW3	2,3,7,8-TCDD	U	2.60E-08		0
NW1 (Nearshore @ Makua)	NW3	2,3,7,8-TCDF	U	4.20E-08		0
NW1 (Nearshore @ Makua)	NW3	OCDD	U	1.51E-06		0
NW1 (Nearshore @ Makua)	NW3	OCDF	U	1.41E-07		0
NW1 (Nearshore @ Makua)	NW3	**TCDD Equivalent**				0

Appendix D-2.1 TCDD Equivalent Calculations for Fish Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
NW1 (Nearshore @ Makua)	NW4	1,2,3,4,6,7,8-HpCDD	U	1.43E-07		0
NW1 (Nearshore @ Makua)	NW4	1,2,3,4,6,7,8-HpCDF	U	6.60E-08		0
NW1 (Nearshore @ Makua)	NW4	1,2,3,4,7,8,9-HpCDF	U	9.20E-08		0
NW1 (Nearshore @ Makua)	NW4	1,2,3,4,7,8-HxCDD	U	6.00E-08		0
NW1 (Nearshore @ Makua)	NW4	1,2,3,4,7,8-HxCDF	U	3.60E-08		0
NW1 (Nearshore @ Makua)	NW4	1,2,3,6,7,8-HxCDD	U	5.70E-08		0
NW1 (Nearshore @ Makua)	NW4	1,2,3,6,7,8-HxCDF	U	3.80E-08		0
NW1 (Nearshore @ Makua)	NW4	1,2,3,7,8,9-HxCDD	U	5.70E-08		0
NW1 (Nearshore @ Makua)	NW4	1,2,3,7,8,9-HxCDF	U	4.60E-08		0
NW1 (Nearshore @ Makua)	NW4	1,2,3,7,8-PeCDD	U	4.00E-08		0
NW1 (Nearshore @ Makua)	NW4	1,2,3,7,8-PeCDF	U	3.30E-08		0
NW1 (Nearshore @ Makua)	NW4	2,3,4,6,7,8-HxCDF	U	4.00E-08		0
NW1 (Nearshore @ Makua)	NW4	2,3,4,7,8-PeCDF	U	3.20E-08		0
NW1 (Nearshore @ Makua)	NW4	2,3,7,8-TCDD	U	2.20E-08		0
NW1 (Nearshore @ Makua)	NW4	2,3,7,8-TCDF	U	3.40E-08		0
NW1 (Nearshore @ Makua)	NW4	OCDD	U	1.14E-06		0
NW1 (Nearshore @ Makua)	NW4	OCDF	U	1.40E-07		0
NW1 (Nearshore @ Makua)	NW4	**TCDD Equivalent**				0
NW1 (Nearshore @ Makua)	NW5	1,2,3,4,6,7,8-HpCDD	U	6.00E-08		0
NW1 (Nearshore @ Makua)	NW5	1,2,3,4,6,7,8-HpCDF	U	7.10E-08		0
NW1 (Nearshore @ Makua)	NW5	1,2,3,4,7,8,9-HpCDF	U	1.00E-07		0
NW1 (Nearshore @ Makua)	NW5	1,2,3,4,7,8-HxCDD	U	9.50E-08		0
NW1 (Nearshore @ Makua)	NW5	1,2,3,4,7,8-HxCDF	U	3.20E-08		0
NW1 (Nearshore @ Makua)	NW5	1,2,3,6,7,8-HxCDD	U	9.10E-08		0
NW1 (Nearshore @ Makua)	NW5	1,2,3,6,7,8-HxCDF	U	3.30E-08		0
NW1 (Nearshore @ Makua)	NW5	1,2,3,7,8,9-HxCDD	U	9.00E-08		0
NW1 (Nearshore @ Makua)	NW5	1,2,3,7,8,9-HxCDF	U	4.10E-08		0
NW1 (Nearshore @ Makua)	NW5	1,2,3,7,8-PeCDD	U	6.50E-08		0
NW1 (Nearshore @ Makua)	NW5	1,2,3,7,8-PeCDF	U	5.00E-08		0
NW1 (Nearshore @ Makua)	NW5	2,3,4,6,7,8-HxCDF	U	3.50E-08		0
NW1 (Nearshore @ Makua)	NW5	2,3,4,7,8-PeCDF	U	4.80E-08		0
NW1 (Nearshore @ Makua)	NW5	2,3,7,8-TCDD	U	3.10E-08		0
NW1 (Nearshore @ Makua)	NW5	2,3,7,8-TCDF	U	5.50E-08		0
NW1 (Nearshore @ Makua)	NW5	OCDD	U	1.24E-06		0
NW1 (Nearshore @ Makua)	NW5	OCDF	U	1.61E-07		0
NW1 (Nearshore @ Makua)	NW5	**TCDD Equivalent**				0
NW2 (Sandy Beach)	NW10	1,2,3,4,6,7,8-HpCDD	U	2.46E-07		0
NW2 (Sandy Beach)	NW10	1,2,3,4,6,7,8-HpCDF	U	2.87E-07		0
NW2 (Sandy Beach)	NW10	1,2,3,4,7,8,9-HpCDF	U	9.30E-08		0
NW2 (Sandy Beach)	NW10	1,2,3,4,7,8-HxCDD	U	7.70E-08		0
NW2 (Sandy Beach)	NW10	1,2,3,4,7,8-HxCDF	U	2.70E-08		0
NW2 (Sandy Beach)	NW10	1,2,3,6,7,8-HxCDD	U	7.40E-08		0
NW2 (Sandy Beach)	NW10	1,2,3,6,7,8-HxCDF	U	2.80E-08		0
NW2 (Sandy Beach)	NW10	1,2,3,7,8,9-HxCDD	U	7.30E-08		0
NW2 (Sandy Beach)	NW10	1,2,3,7,8,9-HxCDF	U	3.50E-08		0
NW2 (Sandy Beach)	NW10	1,2,3,7,8-PeCDD	U	6.50E-08		0
NW2 (Sandy Beach)	NW10	1,2,3,7,8-PeCDF	U	6.60E-08		0
NW2 (Sandy Beach)	NW10	2,3,4,6,7,8-HxCDF	U	3.00E-08		0
NW2 (Sandy Beach)	NW10	2,3,4,7,8-PeCDF	U	6.40E-08		0
NW2 (Sandy Beach)	NW10	2,3,7,8-TCDD	U	2.30E-08		0
NW2 (Sandy Beach)	NW10	2,3,7,8-TCDF	U	4.00E-08		0
NW2 (Sandy Beach)	NW10	OCDD	U	2.20E-06		0
NW2 (Sandy Beach)	NW10	OCDF	U	1.08E-07		0
NW2 (Sandy Beach)	NW10	**TCDD Equivalent**				0

Appendix D-2.1 TCDD Equivalent Calculations for Fish Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
NW2 (Sandy Beach)	NW2fd	1,2,3,4,6,7,8-HpCDD	U	4.80E-07		0
NW2 (Sandy Beach)	NW2fd	1,2,3,4,6,7,8-HpCDF	U	4.80E-07		0
NW2 (Sandy Beach)	NW2fd	1,2,3,4,7,8,9-HpCDF	U	4.10E-07		0
NW2 (Sandy Beach)	NW2fd	1,2,3,4,7,8-HxCDD	U	4.90E-07		0
NW2 (Sandy Beach)	NW2fd	1,2,3,4,7,8-HxCDF	U	3.20E-07		0
NW2 (Sandy Beach)	NW2fd	1,2,3,6,7,8-HxCDD	U	4.80E-07		0
NW2 (Sandy Beach)	NW2fd	1,2,3,6,7,8-HxCDF	U	3.00E-07		0
NW2 (Sandy Beach)	NW2fd	1,2,3,7,8,9-HxCDD	U	4.60E-07		0
NW2 (Sandy Beach)	NW2fd	1,2,3,7,8,9-HxCDF	U	3.70E-07		0
NW2 (Sandy Beach)	NW2fd	1,2,3,7,8-PeCDD	U	6.90E-07		0
NW2 (Sandy Beach)	NW2fd	1,2,3,7,8-PeCDF	U	4.80E-07		0
NW2 (Sandy Beach)	NW2fd	2,3,4,6,7,8-HxCDF	U	3.40E-07		0
NW2 (Sandy Beach)	NW2fd	2,3,4,7,8-PeCDF	U	4.70E-07		0
NW2 (Sandy Beach)	NW2fd	2,3,7,8-TCDD	U	3.40E-07		0
NW2 (Sandy Beach)	NW2fd	2,3,7,8-TCDF	U	2.20E-07		0
NW2 (Sandy Beach)	NW2fd	OCDD	U	1.30E-06		0
NW2 (Sandy Beach)	NW2fd	OCDF	U	6.80E-07		0
NW2 (Sandy Beach)	NW2fd	**TCDD Equivalent**				0
NW2 (Sandy Beach)	NW6	1,2,3,4,6,7,8-HpCDD	U	1.55E-07		0
NW2 (Sandy Beach)	NW6	1,2,3,4,6,7,8-HpCDF	U	1.22E-07		0
NW2 (Sandy Beach)	NW6	1,2,3,4,7,8,9-HpCDF	U	1.65E-07		0
NW2 (Sandy Beach)	NW6	1,2,3,4,7,8-HxCDD	U	1.30E-07		0
NW2 (Sandy Beach)	NW6	1,2,3,4,7,8-HxCDF	U	8.40E-08		0
NW2 (Sandy Beach)	NW6	1,2,3,6,7,8-HxCDD	U	1.24E-07		0
NW2 (Sandy Beach)	NW6	1,2,3,6,7,8-HxCDF	U	8.60E-08		0
NW2 (Sandy Beach)	NW6	1,2,3,7,8,9-HxCDD	U	1.29E-07		0
NW2 (Sandy Beach)	NW6	1,2,3,7,8,9-HxCDF	U	1.07E-07		0
NW2 (Sandy Beach)	NW6	1,2,3,7,8-PeCDD	U	3.64E-07		0
NW2 (Sandy Beach)	NW6	1,2,3,7,8-PeCDF	U	2.42E-07		0
NW2 (Sandy Beach)	NW6	2,3,4,6,7,8-HxCDF	U	9.10E-08		0
NW2 (Sandy Beach)	NW6	2,3,4,7,8-PeCDF	U	2.31E-07		0
NW2 (Sandy Beach)	NW6	2,3,7,8-TCDD	U	3.24E-07		0
NW2 (Sandy Beach)	NW6	2,3,7,8-TCDF	U	2.90E-07		0
NW2 (Sandy Beach)	NW6	OCDD	U	1.01E-06		0
NW2 (Sandy Beach)	NW6	OCDF	U	5.83E-07		0
NW2 (Sandy Beach)	NW6	**TCDD Equivalent**				0
NW2 (Sandy Beach)	NW7	1,2,3,4,6,7,8-HpCDD	J	7.71E-07	0.01	7.71E-09
NW2 (Sandy Beach)	NW7	1,2,3,4,6,7,8-HpCDF	U	2.64E-07		0
NW2 (Sandy Beach)	NW7	1,2,3,4,7,8,9-HpCDF	U	3.56E-07		0
NW2 (Sandy Beach)	NW7	1,2,3,4,7,8-HxCDD	U	1.70E-07		0
NW2 (Sandy Beach)	NW7	1,2,3,4,7,8-HxCDF	U	8.90E-08		0
NW2 (Sandy Beach)	NW7	1,2,3,6,7,8-HxCDD	U	1.62E-07		0
NW2 (Sandy Beach)	NW7	1,2,3,6,7,8-HxCDF	U	9.10E-08		0
NW2 (Sandy Beach)	NW7	1,2,3,7,8,9-HxCDD	U	1.69E-07		0
NW2 (Sandy Beach)	NW7	1,2,3,7,8,9-HxCDF	U	1.13E-07		0
NW2 (Sandy Beach)	NW7	1,2,3,7,8-PeCDD	U	2.09E-07		0
NW2 (Sandy Beach)	NW7	1,2,3,7,8-PeCDF	U	1.12E-07		0
NW2 (Sandy Beach)	NW7	2,3,4,6,7,8-HxCDF	U	9.60E-08		0
NW2 (Sandy Beach)	NW7	2,3,4,7,8-PeCDF	U	1.07E-07		0
NW2 (Sandy Beach)	NW7	2,3,7,8-TCDD	U	1.50E-07		0
NW2 (Sandy Beach)	NW7	2,3,7,8-TCDF	U	1.44E-07		0
NW2 (Sandy Beach)	NW7	OCDD	U	5.23E-06		0
NW2 (Sandy Beach)	NW7	OCDF	U	4.33E-07		0
NW2 (Sandy Beach)	NW7	**TCDD Equivalent**				7.7E-09

Appendix D-2.1 TCDD Equivalent Calculations for Fish Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
NW2 (Sandy Beach)	NW8	1,2,3,4,6,7,8-HpCDD	J	2.05E-07	0.01	2.05E-09
NW2 (Sandy Beach)	NW8	1,2,3,4,6,7,8-HpCDF	U	5.70E-08		0
NW2 (Sandy Beach)	NW8	1,2,3,4,7,8,9-HpCDF	U	7.70E-08		0
NW2 (Sandy Beach)	NW8	1,2,3,4,7,8-HxCDD	U	7.30E-08		0
NW2 (Sandy Beach)	NW8	1,2,3,4,7,8-HxCDF	U	5.20E-08		0
NW2 (Sandy Beach)	NW8	1,2,3,6,7,8-HxCDD	U	7.00E-08		0
NW2 (Sandy Beach)	NW8	1,2,3,6,7,8-HxCDF	U	5.30E-08		0
NW2 (Sandy Beach)	NW8	1,2,3,7,8,9-HxCDD	U	7.30E-08		0
NW2 (Sandy Beach)	NW8	1,2,3,7,8,9-HxCDF	U	6.60E-08		0
NW2 (Sandy Beach)	NW8	1,2,3,7,8-PeCDD	U	7.60E-08		0
NW2 (Sandy Beach)	NW8	1,2,3,7,8-PeCDF	U	4.90E-08		0
NW2 (Sandy Beach)	NW8	2,3,4,6,7,8-HxCDF	U	5.60E-08		0
NW2 (Sandy Beach)	NW8	2,3,4,7,8-PeCDF	U	4.70E-08		0
NW2 (Sandy Beach)	NW8	2,3,7,8-TCDD	U	9.60E-08		0
NW2 (Sandy Beach)	NW8	2,3,7,8-TCDF	U	7.70E-08		0
NW2 (Sandy Beach)	NW8	OCDD	U	1.18E-06		0
NW2 (Sandy Beach)	NW8	OCDF	U	2.23E-07		0
NW2	NW8	**TCDD Equivalent**				2.1E-09
NW2 (Sandy Beach)	NW9	1,2,3,4,6,7,8-HpCDD	U	5.76E-07		0
NW2 (Sandy Beach)	NW9	1,2,3,4,6,7,8-HpCDF	U	4.98E-07		0
NW2 (Sandy Beach)	NW9	1,2,3,4,7,8,9-HpCDF	U	7.40E-08		0
NW2 (Sandy Beach)	NW9	1,2,3,4,7,8-HxCDD	U	4.90E-08		0
NW2 (Sandy Beach)	NW9	1,2,3,4,7,8-HxCDF	U	3.90E-08		0
NW2 (Sandy Beach)	NW9	1,2,3,6,7,8-HxCDD	U	4.70E-08		0
NW2 (Sandy Beach)	NW9	1,2,3,6,7,8-HxCDF	U	4.10E-08		0
NW2 (Sandy Beach)	NW9	1,2,3,7,8,9-HxCDD	U	4.70E-08		0
NW2 (Sandy Beach)	NW9	1,2,3,7,8,9-HxCDF	U	5.00E-08		0
NW2 (Sandy Beach)	NW9	1,2,3,7,8-PeCDD	J	1.72E-07	1	1.72E-07
NW2 (Sandy Beach)	NW9	1,2,3,7,8-PeCDF	U	5.40E-08		0
NW2 (Sandy Beach)	NW9	2,3,4,6,7,8-HxCDF	U	4.40E-08		0
NW2 (Sandy Beach)	NW9	2,3,4,7,8-PeCDF	U	5.20E-08		0
NW2 (Sandy Beach)	NW9	2,3,7,8-TCDD	U	1.80E-08		0
NW2 (Sandy Beach)	NW9	2,3,7,8-TCDF	U	6.83E-07		0
NW2 (Sandy Beach)	NW9	OCDD	U	4.73E-06		0
NW2 (Sandy Beach)	NW9	OCDF	U	6.74E-07		0
NW2 (Sandy Beach)	NW9	**TCDD Equivalent**				1.7E-07

Appendix D-2.2 TCDD Equivalent Calculations for Limu Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,4,6,7,8-HpCDD	U	1.25E-06		0
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,4,6,7,8-HpCDF	J	1.13E-06	0.01	1.13E-08
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,4,7,8,9-HpCDF	U	1.27E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,4,7,8-HxCDD	U	5.80E-08		0
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,4,7,8-HxCDF	J	8.90E-08	0.1	8.90E-09
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,6,7,8-HxCDD	U	5.60E-08		0
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,6,7,8-HxCDF	J	5.70E-08	0.1	5.70E-09
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,7,8,9-HxCDD	U	5.50E-08		0
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,7,8,9-HxCDF	U	3.60E-08		0
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,7,8-PeCDD	U	5.10E-08		0
NW1 (Nearshore @ Makua)	NW1SW1-1	1,2,3,7,8-PeCDF	U	4.00E-08		0
NW1 (Nearshore @ Makua)	NW1SW1-1	2,3,4,6,7,8-HxCDF	U	3.10E-08		0
NW1 (Nearshore @ Makua)	NW1SW1-1	2,3,4,7,8-PeCDF	U	3.80E-08		0
NW1 (Nearshore @ Makua)	NW1SW1-1	2,3,7,8-TCDD	U	2.40E-08		0
NW1 (Nearshore @ Makua)	NW1SW1-1	2,3,7,8-TCDF	U	3.00E-08		0
NW1 (Nearshore @ Makua)	NW1SW1-1	OCDD	U	1.11E-05		0
NW1 (Nearshore @ Makua)	NW1SW1-1	OCDF	J	2.01E-06	0.0001	2.01E-10
NW1 (Nearshore @ Makua)	NW1SW1-1	**TCDD Equivalent**				2.61E-08
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,4,6,7,8-HpCDD	U	4.20E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,4,6,7,8-HpCDF	U	3.00E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,4,7,8,9-HpCDF	U	3.40E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,4,7,8-HxCDD	U	4.20E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,4,7,8-HxCDF	U	2.60E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,6,7,8-HxCDD	U	4.10E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,6,7,8-HxCDF	U	2.40E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,7,8,9-HxCDD	U	3.90E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,7,8,9-HxCDF	U	2.90E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,7,8-PeCDD	U	5.50E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	1,2,3,7,8-PeCDF	U	4.20E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	2,3,4,6,7,8-HxCDF	U	2.70E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	2,3,4,7,8-PeCDF	U	4.20E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	2,3,7,8-TCDD	U	3.70E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	2,3,7,8-TCDF	U	2.10E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	OCDD	U	5.50E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	OCDF	U	5.90E-07		0
NW1 (Nearshore @ Makua)	NW1SW1-1fd	**TCDD Equivalent**				0

Appendix D-2.2 TCDD Equivalent Calculations for Limu Tissue Samples

Location ID	Field Sample ID	Parameter	Qualifier	Value	TEF	TCDD-Equiv
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,4,6,7,8-HpCDD	U	8.04E-06		0
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,4,6,7,8-HpCDF	U	1.67E-06		0
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,4,7,8,9-HpCDF	U	1.08E-07		0
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,4,7,8-HxCDD	U	4.40E-08		0
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,4,7,8-HxCDF	J	1.14E-07	0.1	1.14E-08
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,6,7,8-HxCDD	J	2.42E-07	0.1	2.42E-08
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,6,7,8-HxCDF	U	4.50E-08		0
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,7,8,9-HxCDD	J	3.16E-07	0.1	3.16E-08
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,7,8,9-HxCDF	U	5.50E-08		0
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,7,8-PeCDD	U	4.20E-08		0
NW1 (Nearshore @ Makua)	NW1SW2-1	1,2,3,7,8-PeCDF	U	3.50E-08		0
NW1 (Nearshore @ Makua)	NW1SW2-1	2,3,4,6,7,8-HxCDF	U	4.80E-08		0
NW1 (Nearshore @ Makua)	NW1SW2-1	2,3,4,7,8-PeCDF	U	3.40E-08		0
NW1 (Nearshore @ Makua)	NW1SW2-1	2,3,7,8-TCDD	U	1.10E-08		0
NW1 (Nearshore @ Makua)	NW1SW2-1	2,3,7,8-TCDF	U	2.40E-08		0
NW1 (Nearshore @ Makua)	NW1SW2-1	OCDD	U	6.85E-05		0
NW1 (Nearshore @ Makua)	NW1SW2-1	OCDF	U	5.79E-06		0
NW1 (Nearshore @ Makua)	NW1SW2-1	**TCDD Equivalent**				6.7E-08
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,4,6,7,8-HpCDD	U	3.23E-07		0
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,4,6,7,8-HpCDF	U	3.29E-07		0
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,4,7,8,9-HpCDF	U	1.01E-07		0
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,4,7,8-HxCDD	U	6.90E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,4,7,8-HxCDF	U	4.60E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,6,7,8-HxCDD	U	6.60E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,6,7,8-HxCDF	U	4.90E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,7,8,9-HxCDD	U	6.50E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,7,8,9-HxCDF	U	6.00E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,7,8-PeCDD	U	6.90E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	1,2,3,7,8-PeCDF	U	4.90E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	2,3,4,6,7,8-HxCDF	U	5.20E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	2,3,4,7,8-PeCDF	U	4.70E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	2,3,7,8-TCDD	U	2.80E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	2,3,7,8-TCDF	U	4.40E-08		0
NW1 (Nearshore @ Makua)	NW1SW3-1	OCDD	U	2.32E-06		0
NW1 (Nearshore @ Makua)	NW1SW3-1	OCDF	U	1.18E-07		0
NW1 (Nearshore @ Makua)	NW1SW3-1	**TCDD Equivalent**				0

TCDD-Equivalent Concentratios in
Shellfish Tissue
(mg/kg)

Appendix D-2.3 TCDD Equivalent Calculations for ShellfishTissue Samples

Location ID	Sample ID	Species	Lab	Analyte	Qualifier	Units	Value	TEF	TCDD-equiv.
MNM	MNM-04	Samoan crab	APPL	1,2,3,4,6,7,8-HpCDF	U	mg/kg	3.70E-07		0
MNM	MNM-04	Samoan crab	APPL	1,2,3,4,6,7,8-HpCDD	U	mg/kg	1.84E-06		0
MNM	MNM-04	Samoan crab	APPL	1,2,3,4,7,8,9-HpCDF	U	mg/kg	1.80E-07		0
MNM	MNM-04	Samoan crab	APPL	1,2,3,4,7,8-HxCDF	U	mg/kg	1.80E-07		0
MNM	MNM-04	Samoan crab	APPL	1,2,3,4,7,8-HxCDD	U	mg/kg	2.10E-07		0
MNM	MNM-04	Samoan crab	APPL	1,2,3,6,7,8-HxCDF	U	mg/kg	1.70E-07		0
MNM	MNM-04	Samoan crab	APPL	1,2,3,6,7,8-HxCDD	J	mg/kg	1.20E-06	0.1	1.20E-07
MNM	MNM-04	Samoan crab	APPL	1,2,3,7,8,9-HxCDF	U	mg/kg	6.00E-08		0
MNM	MNM-04	Samoan crab	APPL	1,2,3,7,8,9-HxCDD	J	mg/kg	8.30E-07	0.1	8.30E-08
MNM	MNM-04	Samoan crab	APPL	1,2,3,7,8-PeCDF	U	mg/kg	2.80E-07		0
MNM	MNM-04	Samoan crab	APPL	1,2,3,7,8-PeCDD	U	mg/kg	9.10E-07		0
MNM	MNM-04	Samoan crab	APPL	2,3,4,6,7,8-HxCDF	U	mg/kg	2.90E-07		0
MNM	MNM-04	Samoan crab	APPL	2,3,4,7,8-PeCDF	U	mg/kg	1.10E-07		0
MNM	MNM-04	Samoan crab	APPL	2,3,7,8-TCDF		mg/kg	1.70E-06	0.1	1.70E-07
MNM	MNM-04	Samoan crab	APPL	2,3,7,8-TCDD	U	mg/kg	7.00E-07		0
MNM	MNM-04	Samoan crab	APPL	OCDF	U	mg/kg	2.10E-07		0
MNM	MNM-04	Samoan crab	APPL	OCDD	J	mg/kg	3.00E-06	0.0003	9.00E-10
MNM	MNM-04	Samoan crab	APPL	TCDD, total		mg/kg	3.30E-06		0
MNM	MNM-04	Samoan crab	APPL	TCDF, total	J	mg/kg	1.70E-06		0
MNM	MNM-04	Samoan crab	APPL		**TCDD - Equivalent Concentration**				**3.74E-07**
MNS	MNS-03	Helmet urchin	APPL	1,2,3,4,6,7,8-HpCDF	U	mg/kg	2.60E-07		0
MNS	MNS-03	Helmet urchin	APPL	1,2,3,4,6,7,8-HpCDD	U	mg/kg	3.80E-07		0
MNS	MNS-03	Helmet urchin	APPL	1,2,3,4,7,8,9-HpCDF	U	mg/kg	3.20E-08		0
MNS	MNS-03	Helmet urchin	APPL	1,2,3,4,7,8-HxCDF	U	mg/kg	1.90E-07		0
MNS	MNS-03	Helmet urchin	APPL	1,2,3,4,7,8-HxCDD	U	mg/kg	1.20E-07		0
MNS	MNS-03	Helmet urchin	APPL	1,2,3,6,7,8-HxCDF	U	mg/kg	1.30E-07		0
MNS	MNS-03	Helmet urchin	APPL	1,2,3,6,7,8-HxCDD	U	mg/kg	4.30E-08		0
MNS	MNS-03	Helmet urchin	APPL	1,2,3,7,8,9-HxCDF	U	mg/kg	4.80E-08		0
MNS	MNS-03	Helmet urchin	APPL	1,2,3,7,8,9-HxCDD	U	mg/kg	5.30E-08		0
MNS	MNS-03	Helmet urchin	APPL	1,2,3,7,8-PeCDF	U	mg/kg	2.30E-07		0
MNS	MNS-03	Helmet urchin	APPL	1,2,3,7,8-PeCDD	U	mg/kg	2.10E-07		0
MNS	MNS-03	Helmet urchin	APPL	2,3,4,6,7,8-HxCDF	U	mg/kg	3.90E-08		0
MNS	MNS-03	Helmet urchin	APPL	2,3,4,7,8-PeCDF	U	mg/kg	1.20E-08		0
MNS	MNS-03	Helmet urchin	APPL	2,3,7,8-TCDF	U	mg/kg	4.80E-07		0
MNS	MNS-03	Helmet urchin	APPL	2,3,7,8-TCDD	U	mg/kg	7.90E-08		0
MNS	MNS-03	Helmet urchin	APPL	OCDF	U	mg/kg	5.40E-08		0
MNS	MNS-03	Helmet urchin	APPL	OCDD	J	mg/kg	2.10E-06	0.0003	6.30E-10
MNS	MNS-03	Helmet urchin	APPL	TCDD, total	U	mg/kg	3.19E-06		0
MNS	MNS-03	Helmet urchin	APPL	TCDF, total	J	mg/kg	4.00E-07		0
MNS	MNS-03	Helmet urchin	APPL		**TCDD - Equivalent Concentration**				**6.30E-10**
MNS	MNS-03	Helmet urchin	Test America	2,3,7,8-TCDD	U	mg/kg	5.30E-07		0
MNS	MNS-03	Helmet urchin	Test America	Total TCDD	U	mg/kg	5.30E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,7,8-PeCDD	U	mg/kg	9.00E-07		0
MNS	MNS-03	Helmet urchin	Test America	Total PeCDD	U	mg/kg	9.00E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,4,7,8-HxCDD	U	mg/kg	5.70E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,6,7,8-HxCDD	U	mg/kg	5.60E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,7,8,9-HxCDD	U	mg/kg	5.40E-07		0
MNS	MNS-03	Helmet urchin	Test America	Total HxCDD	U	mg/kg	5.70E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,4,6,7,8-HpCDD	U	mg/kg	1.40E-06		0
MNS	MNS-03	Helmet urchin	Test America	Total HpCDD	U	mg/kg	1.40E-06		0
MNS	MNS-03	Helmet urchin	Test America	OCDD	J	mg/kg	8.00E-06	0.0003	2.40E-09
MNS	MNS-03	Helmet urchin	Test America	2,3,7,8-TCDF	U	mg/kg	4.60E-07		0
MNS	MNS-03	Helmet urchin	Test America	Total TCDF	U	mg/kg	4.60E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,7,8-PeCDF	U	mg/kg	5.60E-07		0
MNS	MNS-03	Helmet urchin	Test America	2,3,4,7,8-PeCDF	U	mg/kg	5.80E-07		0
MNS	MNS-03	Helmet urchin	Test America	Total PeCDF	U	mg/kg	5.80E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,4,7,8-HxCDF	U	mg/kg	3.70E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,6,7,8-HxCDF	U	mg/kg	3.60E-07		0
MNS	MNS-03	Helmet urchin	Test America	2,3,4,6,7,8-HxCDF	U	mg/kg	3.70E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,7,8,9-HxCDF	U	mg/kg	4.20E-07		0
MNS	MNS-03	Helmet urchin	Test America	Total HxCDF	U	mg/kg	4.20E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,4,6,7,8-HpCDF	U	mg/kg	3.70E-07		0
MNS	MNS-03	Helmet urchin	Test America	1,2,3,4,7,8,9-HpCDF	U	mg/kg	4.70E-07		0
MNS	MNS-03	Helmet urchin	Test America	Total HpCDF	U	mg/kg	4.70E-07		0
MNS	MNS-03	Helmet urchin	Test America	OCDF	U	mg/kg	1.10E-06		0
MNS	MNS-03	Helmet urchin	Test America		**TCDD - Equivalent Concentration**				**2.40E-09**

TCDD-Equivalent Concentratios in
Shellfish Tissue
(mg/kg)

Location ID	Sample ID	Species	Lab	Analyte	Qualifier	Units	Value	TEF	TCDD-equiv.
NM	NM-01	Hawaiian prawn	APPL	1,2,3,4,6,7,8-HpCDF	U	mg/kg	7.80E-06		0
NM	NM-01	Hawaiian prawn	APPL	1,2,3,4,6,7,8-HpCDD	U	mg/kg	8.20E-07		0
NM	NM-01	Hawaiian prawn	APPL	1,2,3,4,7,8,9-HpCDF	U	mg/kg	3.80E-06		0
NM	NM-01	Hawaiian prawn	APPL	1,2,3,4,7,8-HxCDF	U	mg/kg	3.60E-06		0
NM	NM-01	Hawaiian prawn	APPL	1,2,3,4,7,8-HxCDD	U	mg/kg	1.40E-07		0
NM	NM-01	Hawaiian prawn	APPL	1,2,3,6,7,8-HxCDF	U	mg/kg	1.50E-06		0
NM	NM-01	Hawaiian prawn	APPL	1,2,3,6,7,8-HxCDD	U	mg/kg	7.40E-08		0
NM	NM-01	Hawaiian prawn	APPL	1,2,3,7,8,9-HxCDF	U	mg/kg	2.90E-07		0
NM	NM-01	Hawaiian prawn	APPL	1,2,3,7,8,9-HxCDD	U	mg/kg	1.70E-07		0
NM	NM-01	Hawaiian prawn	APPL	1,2,3,7,8-PeCDF	U	mg/kg	1.80E-07		0
NM	NM-01	Hawaiian prawn	APPL	1,2,3,7,8-PeCDD	U	mg/kg	6.90E-07		0
NM	NM-01	Hawaiian prawn	APPL	2,3,4,6,7,8-HxCDF	U	mg/kg	3.50E-05		0
NM	NM-01	Hawaiian prawn	APPL	2,3,4,7,8-PeCDF	U	mg/kg	4.20E-07		0
NM	NM-01	Hawaiian prawn	APPL	2,3,7,8-TCDF	U	mg/kg	5.10E-07		0
NM	NM-01	Hawaiian prawn	APPL	2,3,7,8-TCDD	U	mg/kg	6.10E-08		0
NM	NM-01	Hawaiian prawn	APPL	OCDF	U	mg/kg	3.40E-07		0
NM	NM-01	Hawaiian prawn	APPL	OCDD	U	mg/kg	5.20E-06		0
NM	NM-01	Hawaiian prawn	APPL	TCDD, total	J	mg/kg	8.00E-08		0
NM	NM-01	Hawaiian prawn	APPL	TCDF, total	J	mg/kg	2.30E-07		0
NM	NM-01	Hawaiian prawn	APPL		**TCDD - Equivalent Concentration**				**0**
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,4,6,7,8-HpCDF	U	mg/kg	5.70E-06		0
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,4,6,7,8-HpCDD	J	mg/kg	1.20E-06	0.01	1.20E-08
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,4,7,8,9-HpCDF	U	mg/kg	4.90E-08		0
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,4,7,8-HxCDF	U	mg/kg	2.00E-07		0
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,4,7,8-HxCDD	U	mg/kg	1.80E-07		0
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,6,7,8-HxCDF	J	mg/kg	2.20E-06	0.1	2.20E-07
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,6,7,8-HxCDD	J	mg/kg	5.00E-07	0.1	5.00E-08
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,7,8,9-HxCDF	U	mg/kg	1.30E-07		0
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,7,8,9-HxCDD	U	mg/kg	2.70E-07		0
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,7,8-PeCDF	U	mg/kg	1.50E-07		0
NM	NM-01A	Hawaiian prawn	APPL	1,2,3,7,8-PeCDD	U	mg/kg	4.90E-07		0
NM	NM-01A	Hawaiian prawn	APPL	2,3,4,6,7,8-HxCDF	U	mg/kg	1.60E-05		0
NM	NM-01A	Hawaiian prawn	APPL	2,3,4,7,8-PeCDF	U	mg/kg	2.40E-07		0
NM	NM-01A	Hawaiian prawn	APPL	2,3,7,8-TCDF	J	mg/kg	4.60E-07	0.1	4.60E-08
NM	NM-01A	Hawaiian prawn	APPL	2,3,7,8-TCDD	U	mg/kg	3.30E-07		0
NM	NM-01A	Hawaiian prawn	APPL	OCDF	U	mg/kg	5.50E-08		0
NM	NM-01A	Hawaiian prawn	APPL	OCDD		mg/kg	7.10E-06	0.0003	2.13E-09
NM	NM-01A	Hawaiian prawn	APPL	TCDD, total	U	mg/kg	4.10E-06		0
NM	NM-01A	Hawaiian prawn	APPL	TCDF, total	J	mg/kg	1.30E-06		0
NM	NM-01A	Hawaiian prawn	APPL		**TCDD - Equivalent Concentration**				**3.30E-07**
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,4,6,7,8-HpCDF	U	mg/kg	2.40E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,4,6,7,8-HpCDD	U	mg/kg	1.50E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,4,7,8,9-HpCDF	U	mg/kg	3.50E-08		0
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,4,7,8-HxCDF	U	mg/kg	1.00E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,4,7,8-HxCDD	U	mg/kg	1.40E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,6,7,8-HxCDF	U	mg/kg	1.50E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,6,7,8-HxCDD	U	mg/kg	1.70E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,7,8,9-HxCDF	J	mg/kg	2.30E-07	0.1	2.30E-08
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,7,8,9-HxCDD	U	mg/kg	9.40E-08		0
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,7,8-PeCDF	U	mg/kg	1.30E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	1,2,3,7,8-PeCDD	U	mg/kg	1.80E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	2,3,4,6,7,8-HxCDF	U	mg/kg	6.30E-08		0
SBNS	SBNS-01A	Helmet urchin	APPL	2,3,4,7,8-PeCDF	U	mg/kg	1.60E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	2,3,7,8-TCDF	U	mg/kg	4.10E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	2,3,7,8-TCDD	U	mg/kg	8.70E-08		0
SBNS	SBNS-01A	Helmet urchin	APPL	OCDF	U	mg/kg	1.50E-08		0
SBNS	SBNS-01A	Helmet urchin	APPL	OCDD	J	mg/kg	1.20E-06	0.0003	3.60E-10
SBNS	SBNS-01A	Helmet urchin	APPL	TCDD, total	J	mg/kg	1.90E-07		0
SBNS	SBNS-01A	Helmet urchin	APPL	TCDF, total	U	mg/kg	2.94E-06		0
SBNS	SBNS-01A	Helmet urchin	APPL		**TCDD - Equivalent Concentration**				**2.34E-08**

TCDD-Equivalent Concentratios in
Shellfish Tissue
(mg/kg)

Location ID	Sample ID	Species	Lab	Analyte	Qualifier	Units	Value	TEF	TCDD-equiv.
SBNS	SBNS-01A	Helmet urchin	Test America	2,3,7,8-TCDD	U	mg/kg	7.60E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	Total TCDD	U	mg/kg	7.60E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,7,8-PeCDD	U	mg/kg	1.40E-06		0
SBNS	SBNS-01A	Helmet urchin	Test America	Total PeCDD	U	mg/kg	1.40E-06		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,4,7,8-HxCDD	U	mg/kg	9.70E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,6,7,8-HxCDD	U	mg/kg	2.40E-06		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,7,8,9-HxCDD	U	mg/kg	1.40E-06		0
SBNS	SBNS-01A	Helmet urchin	Test America	Total HxCDD		mg/kg	8.10E-06		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,4,6,7,8-HpCDD		mg/kg	7.40E-05	0.01	7.40E-07
SBNS	SBNS-01A	Helmet urchin	Test America	Total HpCDD		mg/kg	1.10E-04		0
SBNS	SBNS-01A	Helmet urchin	Test America	OCDD		mg/kg	2.90E-04	0.0003	8.70E-08
SBNS	SBNS-01A	Helmet urchin	Test America	2,3,7,8-TCDF	U	mg/kg	5.70E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	Total TCDF	U	mg/kg	5.70E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,7,8-PeCDF	U	mg/kg	8.30E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	2,3,4,7,8-PeCDF	U	mg/kg	8.60E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	Total PeCDF	U	mg/kg	1.00E-06		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,4,7,8-HxCDF	U	mg/kg	5.90E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,6,7,8-HxCDF	U	mg/kg	5.80E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	2,3,4,6,7,8-HxCDF	U	mg/kg	5.90E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,7,8,9-HxCDF	U	mg/kg	6.70E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	Total HxCDF	U	mg/kg	6.70E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,4,6,7,8-HpCDF	U	mg/kg	5.90E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	1,2,3,4,7,8,9-HpCDF	U	mg/kg	7.40E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	Total HpCDF	U	mg/kg	7.40E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America	OCDF	U	mg/kg	9.80E-07		0
SBNS	SBNS-01A	Helmet urchin	Test America		**TCDD - Equivalent Concentration**				**8.27E-07**
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,4,6,7,8-HpCDF	U	mg/kg	3.50E-07		0
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,4,6,7,8-HpCDD	U	mg/kg	2.50E-07		0
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,4,7,8,9-HpCDF	U	mg/kg	5.50E-08		0
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,4,7,8-HxCDF	J	mg/kg	3.20E-07	0.1	3.20E-08
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,4,7,8-HxCDD	U	mg/kg	9.20E-08		0
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,6,7,8-HxCDF	J	mg/kg	2.30E-07	0.1	2.30E-08
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,6,7,8-HxCDD	U	mg/kg	3.30E-07		0
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,7,8,9-HxCDF	U	mg/kg	2.90E-08		0
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,7,8,9-HxCDD	U	mg/kg	1.50E-07		0
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,7,8-PeCDF	U	mg/kg	1.80E-07		0
SBNS	SBNS-01B	Helmet urchin	APPL	1,2,3,7,8-PeCDD	U	mg/kg	3.30E-07		0
SBNS	SBNS-01B	Helmet urchin	APPL	2,3,4,6,7,8-HxCDF	U	mg/kg	1.30E-07		0
SBNS	SBNS-01B	Helmet urchin	APPL	2,3,4,7,8-PeCDF	U	mg/kg	1.90E-07		0
SBNS	SBNS-01B	Helmet urchin	APPL	2,3,7,8-TCDF	J	mg/kg	3.10E-07	0.1	3.10E-08
SBNS	SBNS-01B	Helmet urchin	APPL	2,3,7,8-TCDD	U	mg/kg	1.10E-07		0
SBNS	SBNS-01B	Helmet urchin	APPL	OCDF	U	mg/kg	3.80E-08		0
SBNS	SBNS-01B	Helmet urchin	APPL	OCDD	U	mg/kg	1.25E-06		0
SBNS	SBNS-01B	Helmet urchin	APPL	TCDD, total	U	mg/kg	2.55E-06		0
SBNS	SBNS-01B	Helmet urchin	APPL	TCDF, total	J	mg/kg	3.90E-07		0
SBNS	SBNS-01B	Helmet urchin	APPL		**TCDD - Equivalent Concentration**				**8.60E-08**

LEADSPREAD v7.0

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (DTSC)

Fish Consumption
North and South Muliwai - Maximum Detected Lead Concentration
Makua Military Reservation
Makua, HI

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m^3)	0.028
Lead in Soil/Dust (ug/g)	5.4
Lead in Water (ug/l)	15
% Home-grown Produce	100%
Respirable Dust (ug/m^3)	1.5

OUTPUT	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	**1.1**	**2.0**	**2.3**	**2.8**	**3.2**	**70**	**107**
BLOOD Pb, CHILD	**1.5**	**2.7**	**3.2**	**3.8**	**4.4**	**27**	**42**
BLOOD Pb, PICA CHILD	1.5	2.7	3.2	3.9	4.5	25	39
BLOOD Pb, OCCUPATIONAL	1.1	2.0	2.4	2.9	3.3	3,475	5,464

EXPOSURE PARAMETERS	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm^2	5,700	2,900
Skin area occupational	cm^2	2,900	
Soil adherence	ug/cm^2	70	200
Dermal uptake constant	(ug/dl)/(ug/da	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/da	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m^3/day	20	6.8
Inhalation constant	(ug/dl)/(ug/da	0.08	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	5400.0	

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.00	0%	1.4E-5	0.00	0%
Soil Ingestion	8.8E-4	0.00	0%	6.3E-4	0.00	0%
Inhalation, bkgrnd		0.05	4%		0.03	3%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.84	78%		0.84	76%
Food Ingestion, bkgrnd		0.00	0%		0.23	21%
Food Ingestion	3.4E-2	0.18	17%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.00	0%		0.00	0%
Soil Ingestion	7.0E-3	0.04	3%	1.4E-2	0.08	5%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgrnd		0.04	2%		0.04	2%
Water Ingestion		0.96	66%		0.96	64%
Food Ingestion, bkgrnd		0.00	0%		0.00	0%
Food Ingestion	7.9E-2	0.43	29%		0.43	29%

LEADSPREAD v7.0

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (DTSC)

Fish Consumption
Background Muliwai - Maximum Detected Lead Concentration
Makua Military Reservation
Makua, HI

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m^3)	0.028
Lead in Soil/Dust (ug/g)	2.2
Lead in Water (ug/l)	15
% Home-grown Produce	100%
Respirable Dust (ug/m^3)	1.5

OUTPUT	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	**1.0**	**1.8**	**2.1**	**2.5**	**2.9**	**70**	**107**
BLOOD Pb, CHILD	**1.2**	**2.2**	**2.6**	**3.1**	**3.5**	**27**	**42**
BLOOD Pb, PICA CHILD	1.2	2.2	2.6	3.2	3.6	25	39
BLOOD Pb, OCCUPATIONAL	1.1	2.0	2.4	2.9	3.3	3,475	5,464

EXPOSURE PARAMETERS	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm^2	5,700	2,900
Skin area occupational	cm^2	2,900	
Soil adherence	ug/cm^2	70	200
Dermal uptake constant	(ug/dl)/(ug/da	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/da	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m^3/day	20	6.8
Inhalation constant	(ug/dl)/(ug/da	0.08	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	2200.0	

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.00	0%	1.4E-5	0.00	0%
Soil Ingestion	8.8E-4	0.00	0%	6.3E-4	0.00	0%
Inhalation, bkgrnd		0.05	5%		0.03	3%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.84	87%		0.84	76%
Food Ingestion, bkgrnd		0.00	0%		0.23	21%
Food Ingestion	3.4E-2	0.08	8%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.00	0%		0.00	0%
Soil Ingestion	7.0E-3	0.02	1%	1.4E-2	0.03	3%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgrnd		0.04	3%		0.04	3%
Water Ingestion		0.96	81%		0.96	80%
Food Ingestion, bkgrnd		0.00	0%		0.00	0%
Food Ingestion	7.9E-2	0.17	15%		0.17	14%

LEADSPREAD v7.0

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (DTSC)

Fish Consumption
Background Muliwai - Maximum Detected Lead Concentration
Makua Military Reservation
Makua, HI

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m^3)	0.028
Lead in Soil/Dust (ug/g)	2.0
Lead in Water (ug/l)	15
% Home-grown Produce	100%
Respirable Dust (ug/m^3)	1.5

OUTPUT	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	**1.0**	**1.7**	**2.1**	**2.5**	**2.9**	**70**	**107**
BLOOD Pb, CHILD	**1.2**	**2.1**	**2.5**	**3.1**	**3.5**	**27**	**42**
BLOOD Pb, PICA CHILD	1.2	2.2	2.6	3.1	3.5	25	39
BLOOD Pb, OCCUPATIONAL	1.1	2.0	2.4	2.9	3.3	3,475	5,464

EXPOSURE PARAMETERS	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm^2	5,700	2,900
Skin area occupational	cm^2	2,900	
Soil adherence	ug/cm^2	70	200
Dermal uptake constant	(ug/dl)/(ug/da	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/da	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m^3/day	20	6.8
Inhalation constant	(ug/dl)/(ug/da	0.08	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	2000.0	

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.00	0%	1.4E-5	0.00	0%
Soil Ingestion	8.8E-4	0.00	0%	6.3E-4	0.00	0%
Inhalation, bkgrnd		0.05	5%		0.03	3%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.84	88%		0.84	76%
Food Ingestion, bkgrnd		0.00	0%		0.23	21%
Food Ingestion	3.4E-2	0.07	7%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.00	0%		0.00	0%
Soil Ingestion	7.0E-3	0.01	1%	1.4E-2	0.03	2%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgrnd		0.04	3%		0.04	3%
Water Ingestion		0.96	82%		0.96	81%
Food Ingestion, bkgrnd		0.00	0%		0.00	0%
Food Ingestion	7.9E-2	0.16	14%		0.16	13%

LEADSPREAD v7.0

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL (DTSC)

Fish Consumption
Background Muliwai - Maximum Detected Lead Concentration
Makua Military Reservation
Makua, HI

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m^3)	0.028
Lead in Soil/Dust (ug/g)	2.8
Lead in Water (ug/l)	15
% Home-grown Produce	100%
Respirable Dust (ug/m^3)	1.5

OUTPUT							
	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	**1.0**	**1.8**	**2.1**	**2.6**	**2.9**	**70**	**107**
BLOOD Pb, CHILD	**1.2**	**2.3**	**2.7**	**3.3**	**3.7**	**27**	**42**
BLOOD Pb, PICA CHILD	1.3	2.3	2.7	3.3	3.8	25	39
BLOOD Pb, OCCUPATIONAL	1.1	2.0	2.4	2.9	3.3	3,475	5,464

EXPOSURE PARAMETERS			
	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm^2	5,700	2,900
Skin area occupational	cm^2	2,900	
Soil adherence	ug/cm^2	70	200
Dermal uptake constant	(ug/dl)/(ug/d	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/d	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m^3/day	20	6.8
Inhalation constant	(ug/dl)/(ug/d	0.08	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	2800.0	

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.00	0%	1.4E-5	0.00	0%
Soil Ingestion	8.8E-4	0.00	0%	6.3E-4	0.00	0%
Inhalation, bkgrnd		0.05	5%		0.03	3%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.84	85%		0.84	76%
Food Ingestion, bkgrnd		0.00	0%		0.23	21%
Food Ingestion	3.4E-2	0.10	10%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.00	0%		0.00	0%
Soil Ingestion	7.0E-3	0.02	2%	1.4E-2	0.04	3%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgrnd		0.04	3%		0.04	3%
Water Ingestion		0.96	78%		0.96	76%
Food Ingestion, bkgrnd		0.00	0%		0.00	0%
Food Ingestion	7.9E-2	0.22	18%		0.22	18%

LEAD RISK ASSESSMENT SPREADSHEET

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Shellfish Consumption

North and South Muliwai - Maximum Detected Lead Concentration

Makua Military Reservation

Makua, HI

USER'S GUIDE to version 7

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m^3)	0.028
Lead in Soil/Dust (ug/g)	0.16
Lead in Water (ug/l)	15
% Home-grown Produce	100%
Respirable Dust (ug/m^3)	1.5

OUTPUT							
	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	0.9	1.6	1.9	2.3	2.7	70	107
BLOOD Pb, CHILD	1.0	1.8	2.2	2.7	3.0	27	42
BLOOD Pb, PICA CHILD	1.4	2.6	3.1	3.7	4.3	25	39
BLOOD Pb, OCCUPATIONAL	1.1	2.0	2.4	2.9	3.3	3475	5464

EXPOSURE PARAMETERS			
	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm^2	5700	2900
Skin area occupational	cm^2	2900	
Soil adherence	ug/cm^2	70	200
Dermal uptake constant	(ug/dl)/(ug/day)	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/day)	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m^3/day	20	6.8
Inhalation constant	(ug/dl)/(ug/day)	0.082	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	160	

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.00	0%	1.4E-5	0.00	0%
Soil Ingestion	8.8E-4	0.00	0%	6.3E-4	0.00	0%
Inhalation, bkgrnd		0.05	5%		0.03	3%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.84	94%		0.84	76%
Food Ingestion, bkgrnd		0.00	0%		0.23	21%
Food Ingestion	3.4E-2	0.01	1%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.00	0%		0.00	0%
Soil Ingestion	7.0E-3	0.00	0%	1.4E-2	0.00	0%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgrnd		0.04	4%		0.04	3%
Water Ingestion		0.96	95%		0.96	67%
Food Ingestion, bkgrnd		0.00	0%		0.00	0%
Food Ingestion	7.9E-2	0.01	1%		0.43	30%

LEAD RISK ASSESSMENT SPREADSHEET

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Shellfish Consumption

Makua Nearshore - Maximum Detected Lead Concentration

Makua Military Reservation

Makua, HI

USER'S GUIDE to version 7

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m^3)	0.028
Lead in Soil/Dust (ug/g)	0.33
Lead in Water (ug/l)	15
% Home-grown Produce	100%
Respirable Dust (ug/m^3)	1.5

OUTPUT							
	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	0.9	1.6	1.9	2.4	2.7	70	107
BLOOD Pb, CHILD	1.0	1.9	2.2	2.7	3.1	27	42
BLOOD Pb, PICA CHILD	1.0	1.9	2.2	2.7	3.1	25	39
BLOOD Pb, OCCUPATIONAL	1.1	2.0	2.4	2.9	3.3	3475	5464

EXPOSURE PARAMETERS			
	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm^2	5700	2900
Skin area occupational	cm^2	2900	
Soil adherence	ug/cm^2	70	200
Dermal uptake constant	(ug/dl)/(ug/day)	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/day)	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m^3/day	20	6.8
Inhalation constant	(ug/dl)/(ug/day)	0.082	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	330	

PATHWAYS						
ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.00	0%	1.4E-5	0.00	0%
Soil Ingestion	8.8E-4	0.00	0%	6.3E-4	0.00	0%
Inhalation, bkgrnd		0.05	5%		0.03	3%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.84	94%		0.84	76%
Food Ingestion, bkgrnd		0.00	0%		0.23	21%
Food Ingestion	3.4E-2	0.01	1%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.00	0%		0.00	0%
Soil Ingestion	7.0E-3	0.00	0%	1.4E-2	0.00	0%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgrnd		0.04	4%		0.04	4%
Water Ingestion		0.96	94%		0.96	93%
Food Ingestion, bkgrnd		0.00	0%		0.00	0%
Food Ingestion	7.9E-2	0.03	3%		0.03	3%

LEAD RISK ASSESSMENT SPREADSHEET

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Shellfish Consumption

Sandy Beach - Maximum Detected Lead Concentration

Makua Military Reservation

Makua, HI

USER'S GUIDE to version 7

INPUT	
MEDIUM	LEVEL
Lead in Air (ug/m^3)	0.028
Lead in Soil/Dust (ug/g)	0.98
Lead in Water (ug/l)	15
% Home-grown Produce	100%
Respirable Dust (ug/m^3)	1.5

OUTPUT							
	Percentile Estimate of Blood Pb (ug/dl)					PRG-99	PRG-95
	50th	90th	95th	98th	99th	(ug/g)	(ug/g)
BLOOD Pb, ADULT	0.9	1.7	2.0	2.4	2.8	70	107
BLOOD Pb, CHILD	1.1	2.0	2.3	2.8	3.2	27	42
BLOOD Pb, PICA CHILD	1.1	2.0	2.4	2.9	3.3	25	39
BLOOD Pb, OCCUPATIONAL	1.1	2.0	2.4	2.9	3.3	3475	5464

EXPOSURE PARAMETERS			
	units	adults	children
Days per week	days/wk	7	
Days per week, occupational		5	
Geometric Standard Deviation		1.6	
Blood lead level of concern (ug/dl)		10	
Skin area, residential	cm^2	5700	2900
Skin area occupational	cm^2	2900	
Soil adherence	ug/cm^2	70	200
Dermal uptake constant	(ug/dl)/(ug/day)	0.0001	
Soil ingestion	mg/day	50	100
Soil ingestion, pica	mg/day		200
Ingestion constant	(ug/dl)/(ug/day)	0.04	0.16
Bioavailability	unitless	0.44	
Breathing rate	m^3/day	20	6.8
Inhalation constant	(ug/dl)/(ug/day)	0.082	0.192
Water ingestion	l/day	1.4	0.4
Food ingestion	kg/day	1.9	1.1
Lead in market basket	ug/kg	3.1	
Lead in home-grown produce	ug/kg	980	

PATHWAYS

ADULTS	Residential			Occupational		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	3.8E-5	0.00	0%	1.4E-5	0.00	0%
Soil Ingestion	8.8E-4	0.00	0%	6.3E-4	0.00	0%
Inhalation, bkgrnd		0.05	5%		0.03	3%
Inhalation	2.5E-6	0.00	0%	1.8E-6	0.00	0%
Water Ingestion		0.84	91%		0.84	76%
Food Ingestion, bkgrnd		0.00	0%		0.23	21%
Food Ingestion	3.4E-2	0.03	4%			0%

CHILDREN	typical			with pica		
	Pathway contribution			Pathway contribution		
Pathway	PEF	ug/dl	percent	PEF	ug/dl	percent
Soil Contact	5.6E-5	0.00	0%		0.00	0%
Soil Ingestion	7.0E-3	0.01	1%	1.4E-2	0.01	1%
Inhalation	2.0E-6	0.00	0%		0.00	0%
Inhalation, bkgrnd		0.04	3%		0.04	3%
Water Ingestion		0.96	89%		0.96	88%
Food Ingestion, bkgrnd		0.00	0%		0.00	0%
Food Ingestion	7.9E-2	0.08	7%		0.08	7%

Appendix D.4-1 - North and South Site
Human Health Risk Calculations for Fish Consumption

$$Intake = \frac{C_{sf} \times CR \times EF \times ED}{BW \times AT}$$

CR = 0.1006 for subsistence; 0.034 for recreational
EF = 365
ED = 30
BW = 70
AT = noncarcinogens = 30 yrs * 365 days/yr;
carcinog = 70 yrs * 365 days/yr

			Noncarcinogens				Carcinogens			
			Subsistence Intake (mg/kg-day)		**Recreational Intake (mg/kg-day)**		**Subsistence Intake (mg/kg-day)**		**Recreational Intake (mg/kg-day)**	
Chemical	**Arithmetic Mean**	**MaxD**	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD
Acetone	0.35	0.38	4.96E-04	5.46E-04	1.68E-04	1.85E-04	2.13E-04	2.34E-04	7.19E-05	7.91E-05
Aluminum	2098	4240	3.02E+00	6.09E+00	1.02E+00	2.06E+00	1.29E+00	2.61E+00	4.37E-01	8.83E-01
Antimony	0.02	0.05	3.21E-05	7.57E-05	1.09E-05	2.56E-05	1.38E-05	3.25E-05	4.65E-06	1.10E-05
Arsenic, organic	4.6	30	6.60E-03	4.28E-02	2.23E-03	1.45E-02	2.83E-03	1.84E-02	9.55E-04	6.20E-03
Barium	18	26	2.64E-02	3.75E-02	8.92E-03	1.27E-02	1.13E-02	1.61E-02	3.82E-03	5.43E-03
Beryllium	0.02	0.05	3.37E-05	7.33E-05	1.14E-05	2.48E-05	1.45E-05	3.14E-05	4.89E-06	1.06E-05
BHC, beta	0.001	0.004	1.75E-06	5.89E-06	5.92E-07	1.99E-06	7.50E-07	2.53E-06	2.54E-07	8.53E-07
BHC, delta	0.001	0.0003	1.12E-06	4.46E-07	3.78E-07	1.51E-07	4.80E-07	1.91E-07	1.62E-07	6.45E-08
BHC, gamma	0.001	0.002	1.46E-06	2.44E-06	4.94E-07	8.26E-07	6.26E-07	1.05E-06	2.12E-07	3.54E-07
Bis(2-ethylhexyl)phthalate	0.35	3.1	4.97E-04	4.46E-03	1.68E-04	1.51E-03	2.13E-04	1.91E-03	7.21E-05	6.45E-04
Cadmium	0.05	0.15	7.50E-05	2.11E-04	2.53E-05	7.14E-05	3.21E-05	9.05E-05	1.09E-05	3.06E-05
Chromium	13	32	1.89E-02	4.53E-02	6.40E-03	1.53E-02	8.11E-03	1.94E-02	2.74E-03	6.56E-03
Cobalt	2.4	4.2	3.46E-03	5.99E-03	1.17E-03	2.03E-03	1.48E-03	2.57E-03	5.02E-04	8.68E-04
Copper	51	166	7.39E-02	2.39E-01	2.50E-02	8.06E-02	3.17E-02	1.02E-01	1.07E-02	3.46E-02
4,4'-DDT	0.001	0.003	1.61E-06	4.17E-06	5.45E-07	1.41E-06	6.91E-07	1.79E-06	2.34E-07	6.04E-07
di-n-Butylphthalate	0.22	1.5	3.10E-04	2.16E-03	1.05E-04	7.29E-04	1.33E-04	9.24E-04	4.49E-05	3.12E-04
Heptachlor epoxide	0.001	0.001	1.92E-06	1.34E-06	6.50E-07	4.52E-07	8.25E-07	5.73E-07	2.79E-07	1.94E-07
Iron	2708	4530	3.89E+00	6.51E+00	1.32E+00	2.20E+00	1.67E+00	2.79E+00	5.64E-01	9.43E-01
Lead	2.1	5.4	3.01E-03	7.75E-03	1.02E-03	2.62E-03	1.29E-03	3.32E-03	4.36E-04	1.12E-03
m,p-Xylenes	0.01	0.02	1.83E-05	2.44E-05	6.19E-06	8.26E-06	7.85E-06	1.05E-05	2.65E-06	3.54E-06
Manganese	181	386	2.60E-01	5.55E-01	8.79E-02	1.87E-01	1.11E-01	2.38E-01	3.77E-02	8.04E-02
Mercury	0.06	0.10	8.02E-05	1.48E-04	2.71E-05	5.00E-05	3.44E-05	6.34E-05	1.16E-05	2.14E-05
Methyl mercury	0.06	0.17	8.25E-05	2.44E-04	2.79E-05	8.26E-05	3.54E-05	1.05E-04	1.20E-05	3.54E-05
Perchlorate	0.03	0.16	3.90E-05	2.30E-04	1.32E-05	7.77E-05	1.67E-05	9.85E-05	5.66E-06	3.33E-05
Selenium	2.5	3.7	3.54E-03	5.33E-03	1.20E-03	1.80E-03	1.52E-03	2.29E-03	5.13E-04	7.72E-04
Silver	0.36	1.1	5.23E-04	1.62E-03	1.77E-04	5.49E-04	2.24E-04	6.96E-04	7.58E-05	2.35E-04
Thallium	0.01	0.01	8.71E-06	8.42E-06	2.94E-06	2.85E-06	3.73E-06	3.61E-06	1.26E-06	1.22E-06
Vanadium	12	19	1.72E-02	2.77E-02	5.80E-03	9.37E-03	7.36E-03	1.19E-02	2.49E-03	4.02E-03
Zinc	114	201	1.64E-01	2.89E-01	5.54E-02	9.76E-02	7.03E-02	1.24E-01	2.37E-02	4.18E-02
TCDD equivalents	3.1E-13	1.8E-12	4.43E-16	2.53E-15	1.50E-16	8.54E-16	1.90E-16	1.08E-15	6.41E-17	3.66E-16

Appendix D.4-1 - North and South Site
Human Health Risk Calculations for Fish Consumption

			Non-carcinogenic HI (Arithmetic Mean)			Non-carcinogenic HI (MaxD)			Carcinogenic Risk (Mean)			Carcinogenic Risk (MaxD)		
Chemical	**Arithmetic Mean**	**MaxD**	RfDo	Subsistence	Recreational	RfDo	Subsistence	Recreational	SF	Subsistence	Recreational	SF	Subsistence	Recreational
Acetone	0.35	0.38	0.9	5.51E-04	1.86E-04	0.9	6.07E-04	2.05E-04	-	-	-	-	-	-
Aluminum	2098	4240	1	3.02E+00	1.02E+00	1	6.09E+00	2.06E+00	-	-	-	-	-	-
Antimony	0.02	0.05	0.0004	8.03E-02	2.71E-02	0.0004	1.89E-01	6.40E-02	-	-	-	-	-	-
Arsenic, organic	4.6	30	-	-	-	-	-	-	-	-	-	-	-	-
Barium	18	26	0.07	3.77E-01	1.27E-01	0.07	5.36E-01	1.81E-01	-	-	-	-	-	-
Beryllium	0.02	0.05	0.002	1.69E-02	5.70E-03	0.002	3.66E-02	1.24E-02	-	-	-	-	-	-
BHC, beta	0.001	0.004	0.0003	5.83E-03	1.97E-03	0.0003	1.96E-02	6.64E-03	1.8	1.35E-06	4.56E-07	1.8	4.55E-06	1.54E-06
BHC, delta	0.001	0.0003	0.0003	3.73E-03	1.26E-03	0.0003	1.49E-03	5.02E-04	-	-	-	-	-	-
BHC, gamma	0.001	0.002	0.0003	4.87E-03	1.65E-03	0.0003	8.14E-03	2.75E-03	1.3	8.14E-07	2.75E-07	1.3	1.36E-06	4.60E-07
Bis(2-ethylhexyl)phthalate	0.35	3.1	0.02	2.49E-02	8.41E-03	0.02	2.23E-01	7.53E-02	0.014	2.98E-06	1.01E-06	0.014	2.67E-05	9.03E-06
Cadmium	0.05	0.15	0.0005	1.50E-01	5.07E-02	0.0005	4.23E-01	1.43E-01	-	-	-	-	-	-
Chromium	13	32	1.5	1.26E-02	4.26E-03	1.5	3.02E-02	1.02E-02	-	-	-	-	-	-
Cobalt	2.4	4.2	0.02	1.73E-01	5.85E-02	0.02	3.00E-01	1.01E-01	-	-	-	-	-	-
Copper	51	166	0.04	1.85E+00	6.24E-01	0.04	5.96E+00	2.02E+00	-	-	-	-	-	-
4,4'-DDT	0.001	0.003	0.0005	3.23E-03	1.09E-03	0.0005	8.34E-03	2.82E-03	0.34	2.35E-07	7.94E-08	0.34	6.07E-07	2.05E-07
di-n-Butylphthalate	0.22	1.5	0.1	3.10E-03	1.05E-03	0.1	2.16E-02	7.29E-03	-	-	-	-	-	-
Heptachlor epoxide	0.001	0.001	1E-05	1.48E-01	5.00E-02	0.000013	1.03E-01	3.47E-02	9.1	7.51E-06	2.54E-06	9.1	5.21E-06	1.76E-06
Iron	2708	4530	-	-	-	-	-	-	–	-	-	–	-	-
Lead	2.1	5.4	-	-	-	-	-	-	-	-	-	-	-	-
m,p-Xylenes	0.01	0.02	0.2	9.16E-05	3.10E-05	0.2	1.22E-04	4.13E-05	-	-	-	-	-	-
Manganese	181	386	0.024	1.08E+01	3.66E+00	0.024	2.31E+01	7.81E+00	-	-	-	-	-	-
Mercury	0.06	0.10	0.0003	2.67E-01	9.03E-02	0.0003	4.93E-01	1.67E-01	-	-	-	-	-	-
Methyl mercury	0.06	0.17	0.0001	8.25E-01	2.79E-01	0.0001	2.44E+00	8.26E-01	-	-	-	-	-	-
Perchlorate	0.03	0.16	0.0007	5.58E-02	1.89E-02	0.0007	3.28E-01	1.11E-01	-	-	-	-	-	-
Selenium	2.5	3.7	0.005	7.08E-01	2.39E-01	0.005	1.07E+00	3.60E-01	-	-	-	-	-	-
Silver	0.36	1.1	0.005	1.05E-01	3.54E-02	0.005	3.25E-01	1.10E-01	-	-	-	-	-	-
Thallium	0.01	0.01	8E-05	1.09E-01	3.68E-02	0.00008	1.05E-01	3.56E-02	-	-	-	-	-	-
Vanadium	12	19	0.02	8.58E-01	2.90E-01	0.02	1.39E+00	4.69E-01	-	-	-	-	-	-
Zinc	114	201	0.3	5.47E-01	1.85E-01	0.3	9.63E-01	3.25E-01	-	-	-	-	-	-
TCDD equivalents	3.1E-13	1.8E-12	-	-	-	-	-	-	150000	2.85E-11	9.62E-12	150000	1.63E-10	5.49E-11

Appendix D.4-2 - Background (Nanakuli Muliwai)
Human Health Risk Calculations for Fish Consumption

$$Intake = \frac{C_{sf} \times CR \times EF \times ED}{BW \times AT}$$

CR = 0.1006 for subsistence; 0.034 for recreational
EF = 365
ED = 30
BW = 70
AT = noncarcinogens = 30 yrs * 365 days/yr;
carcinog = 70 yrs * 365 days/yr

			Noncarcinogens				Carcinogens			
			Subsistence Intake (mg/kg-day)		**Recreational Intake (mg/kg-day)**		**Subsistence Intake (mg/kg-day)**		**Recreational Intake (mg/kg-day)**	
Chemical	**Arithmetic Mean**	**MaxD**	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD	Arithmetic Mea	MaxD
Aluminum	4467	5170	6.42E+00	7.43E+00	2.17E+00	2.51E+00	2.75E+00	3.18E+00	9.30E-01	1.08E+00
Arsenic, organic	2.5	2.6	3.65E-03	3.69E-03	1.23E-03	1.25E-03	1.56E-03	1.58E-03	5.29E-04	5.35E-04
Barium	41	44	5.86E-02	6.27E-02	1.98E-02	2.12E-02	2.51E-02	2.69E-02	8.49E-03	9.08E-03
Beryllium	0.08	0.09	1.22E-04	1.35E-04	4.11E-05	4.57E-05	5.21E-05	5.79E-05	1.76E-05	1.96E-05
Cadmium	0.12	0.13	1.72E-04	1.87E-04	5.83E-05	6.31E-05	7.39E-05	8.01E-05	2.50E-05	2.71E-05
Chromium	22	25	3.20E-02	3.55E-02	1.08E-02	1.20E-02	1.37E-02	1.52E-02	4.63E-03	5.14E-03
Cobalt	4.9	5.3	7.04E-03	7.55E-03	2.38E-03	2.55E-03	3.02E-03	3.23E-03	1.02E-03	1.09E-03
Copper	72	80	1.03E-01	1.15E-01	3.48E-02	3.88E-02	4.41E-02	4.92E-02	1.49E-02	1.66E-02
4,4'-DDT	0.001	0.001	1.77E-06	2.01E-06	5.97E-07	6.80E-07	7.58E-07	8.62E-07	2.56E-07	2.91E-07
di-n-Butylphthalate	0.02	0.02	2.20E-05	2.59E-05	7.45E-06	8.74E-06	9.44E-06	1.11E-05	3.19E-06	3.75E-06
Heptachlor epoxide	0.001	0.001	1.49E-06	1.58E-06	5.05E-07	5.34E-07	6.41E-07	6.78E-07	2.16E-07	2.29E-07
Iron	5997	7010	8.62E+00	1.01E+01	2.91E+00	3.40E+00	3.69E+00	4.32E+00	1.25E+00	1.46E+00
Lead	2.1	2.2	2.96E-03	3.09E-03	1.00E-03	1.04E-03	1.27E-03	1.32E-03	4.29E-04	4.48E-04
Manganese	572	611	8.22E-01	8.78E-01	2.78E-01	2.97E-01	3.52E-01	3.76E-01	1.19E-01	1.27E-01
Mercury	0.04	0.05	6.32E-05	6.75E-05	2.14E-05	2.28E-05	2.71E-05	2.89E-05	9.16E-06	9.78E-06
Methyl mercury	0.04	0.05	5.65E-05	7.62E-05	1.91E-05	2.57E-05	2.42E-05	3.26E-05	8.19E-06	1.10E-05
Perchlorate	0.0006	0.001	8.06E-07	2.01E-06	2.72E-07	6.80E-07	3.45E-07	8.62E-07	1.17E-07	2.91E-07
Selenium	2.4	2.6	3.43E-03	3.69E-03	1.16E-03	1.25E-03	1.47E-03	1.58E-03	4.96E-04	5.35E-04
Silver	0.61	0.70	8.74E-04	1.01E-03	2.95E-04	3.41E-04	3.74E-04	4.33E-04	1.27E-04	1.46E-04
Vanadium	21	24	3.01E-02	3.39E-02	1.02E-02	1.15E-02	1.29E-02	1.45E-02	4.36E-03	4.91E-03
Zinc	112	116	1.60E-01	1.67E-01	5.42E-02	5.63E-02	6.88E-02	7.14E-02	2.32E-02	2.41E-02
TCDD equivalents	2.6E-15	3.8E-15	3.73E-18	5.46E-18	1.26E-18	1.84E-18	1.60E-18	2.34E-18	5.40E-19	7.91E-19

Appendix D.4-2 - Background (Nanakuli Muliwai)
Human Health Risk Calculations for Fish Consumption

			Non-carcinogenic HI (Arithmetic Mean)			Non-carcinogenic HI (MaxD)			Carcinogenic Risk (Mean)			Carcinogenic Risk (MaxD)		
Chemical	**Arithmetic Mean**	**MaxD**	RfDo	Subsistence	Recreational	RfDo	Subsistence	Recreational	SF	Subsistence	Recreational	SF	Subsistence	Recreational
Aluminum	4467	5170	1.0	6.42E+00	2.17E+00	1.0	7.43E+00	2.51E+00	-	-	-	-	-	-
Arsenic, organic	2.5	2.6	-	-	-	-	-	-	-	-	-	-	-	-
Barium	41	44	0.07	8.38E-01	2.83E-01	0.07	8.95E-01	3.03E-01	-	-	-	-	-	-
Beryllium	0.08	0.09	0.002	6.08E-02	2.06E-02	0.002	6.75E-02	2.28E-02	-	-	-	-	-	-
Cadmium	0.12	0.13	0.0005	3.45E-01	1.17E-01	0.0005	3.74E-01	1.26E-01	-	-	-	-	-	-
Chromium	22	25	1.5	2.13E-02	7.20E-03	1.5	2.37E-02	8.00E-03	-	-	-	-	-	-
Cobalt	4.9	5.3	0.02	3.52E-01	1.19E-01	0.02	3.77E-01	1.28E-01	-	-	-	-	-	-
Copper	72	80	0.04	2.57E+00	8.69E-01	0.04	2.87E+00	9.70E-01	-	-	-	-	-	-
4,4'-DDT	0.001	0.001	0.0005	3.54E-03	1.19E-03	0.0005	4.02E-03	1.36E-03	0.34	2.58E-07	8.71E-08	0.34	2.93E-07	9.91E-08
di-n-Butylphthalate	0.02	0.02	0.1	2.20E-04	7.45E-05	0.1	2.59E-04	8.74E-05	-	-	-	-	-	-
Heptachlor epoxide	0.001	0.001	1.30E-05	1.15E-01	3.89E-02	1E-05	1.22E-01	4.11E-02	9.1	5.83E-06	1.97E-06	9.1	6.17E-06	2.08E-06
Iron	5997	7010	-	-	-	-	-	-	–	-	-	–	-	-
Lead	2.1	2.2	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	572	611	0.024	3.42E+01	1.16E+01	0.024	3.66E+01	1.24E+01	-	-	-	-	-	-
Mercury	0.04	0.05	0.0003	2.11E-01	7.12E-02	0.0003	2.25E-01	7.61E-02	-	-	-	-	-	-
Methyl mercury	0.04	0.05	0.0001	5.65E-01	1.91E-01	0.0001	7.62E-01	2.57E-01	-	-	-	-	-	-
Perchlorate	0.0006	0.001	0.0007	1.15E-03	3.89E-04	0.0007	2.87E-03	9.71E-04	-	-	-	-	-	-
Selenium	2.4	2.6	0.005	6.85E-01	2.32E-01	0.005	7.39E-01	2.50E-01	-	-	-	-	-	-
Silver	0.61	0.70	0.005	1.75E-01	5.91E-02	0.005	2.02E-01	6.83E-02	-	-	-	-	-	-
Vanadium	21	24	0.2	1.51E-01	5.09E-02	0.2	1.70E-01	5.73E-02	-	-	-	-	-	-
Zinc	112	116	0.3	5.35E-01	1.81E-01	0.3	5.56E-01	1.88E-01	-	-	-	-	-	-
TCDD equivalents	2.6E-15	3.8E-15	-	-	-	-	-	-	150000	2.40E-13	8.09E-14	150000	3.51E-13	1.19E-13

Appendix D.4-3 - Nearshore at Makua
Human Health Risk Calculations for Fish Consumption

$$Intake = \frac{C_{sf} \times CR \times EF \times ED}{BW \times AT}$$

CR = 0.1006 for subsistence; 0.034 for recreational
EF = 365
ED = 30
BW = 70
AT = noncarcinogens = 30 yrs * 365 days/yr;
carcinog = 70 yrs * 365 days/yr

			Noncarcinogens				Carcinogens			
			Subsistence Intake (mg/kg-day)		**Recreational Intake (mg/kg-day)**		**Subsistence Intake (mg/kg-day)**		**Recreational Intake (mg/kg-day)**	
Chemical	**Arithmetic Mean**	**MaxD**	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD
Acetone	0.48	0.73	6.96E-04	1.05E-03	2.35E-04	3.55E-04	2.98E-04	4.50E-04	1.01E-04	1.52E-04
Aldrin	0.002	0.003	2.83E-06	3.88E-06	9.56E-07	1.31E-06	1.21E-06	1.66E-06	4.10E-07	5.62E-07
Aluminum	31	65	4.40E-02	9.34E-02	1.49E-02	3.16E-02	1.89E-02	4.00E-02	6.38E-03	1.35E-02
Arsenic, organic	23	37	3.31E-02	5.36E-02	1.12E-02	1.81E-02	1.42E-02	2.30E-02	4.79E-03	7.76E-03
Barium	7.0	32	1.00E-02	4.54E-02	3.39E-03	1.53E-02	4.30E-03	1.95E-02	1.45E-03	6.58E-03
BHC, alpha	0.002	0.008	2.95E-06	1.18E-05	9.97E-07	3.98E-06	1.26E-06	5.05E-06	4.27E-07	1.71E-06
BHC, delta	0.001	0.0003	1.59E-06	4.31E-07	5.37E-07	1.46E-07	6.82E-07	1.85E-07	2.30E-07	6.24E-08
BHC, gamma	0.003	0.006	3.84E-06	9.05E-06	1.30E-06	3.06E-06	1.64E-06	3.88E-06	5.56E-07	1.31E-06
Bis(2-Ethylhexyl)Phthalate	1.4	3.5	2.02E-03	5.03E-03	6.82E-04	1.70E-03	8.65E-04	2.16E-03	2.92E-04	7.29E-04
Cadmium	0.15	0.21	2.17E-04	3.02E-04	7.33E-05	1.02E-04	9.30E-05	1.29E-04	3.14E-05	4.37E-05
Chromium	5.7	10	8.15E-03	1.49E-02	2.75E-03	5.05E-03	3.49E-03	6.41E-03	1.18E-03	2.16E-03
Cobalt	0.23	0.41	3.31E-04	5.94E-04	1.12E-04	2.01E-04	1.42E-04	2.54E-04	4.80E-05	8.60E-05
Copper	4.2	9.8	6.05E-03	1.41E-02	2.04E-03	4.75E-03	2.59E-03	6.02E-03	8.76E-04	2.04E-03
4,4'-DDT	0.0005	0.0002	7.06E-07	2.59E-07	2.39E-07	8.74E-08	3.03E-07	1.11E-07	1.02E-07	3.75E-08
di-n-Butylphthalate	0.31	1.4	4.45E-04	2.01E-03	1.50E-04	6.80E-04	1.91E-04	8.62E-04	6.44E-05	2.91E-04
Heptachlor	0.002	0.01	2.69E-06	8.05E-06	9.08E-07	2.72E-06	1.15E-06	3.45E-06	3.89E-07	1.17E-06
Heptachlor epoxide	0.01	0.01	8.78E-06	2.01E-05	2.97E-06	6.80E-06	3.76E-06	8.62E-06	1.27E-06	2.91E-06
Iron	163	302	2.34E-01	4.34E-01	7.92E-02	1.47E-01	1.00E-01	1.86E-01	3.39E-02	6.29E-02
Lead	0.70	2.0	1.01E-03	2.89E-03	3.40E-04	9.76E-04	4.31E-04	1.24E-03	1.46E-04	4.18E-04
m,p-Xylenes	0.01	0.02	2.12E-05	2.87E-05	7.16E-06	9.71E-06	9.08E-06	1.23E-05	3.07E-06	4.16E-06
Manganese	7.7	16	1.10E-02	2.26E-02	3.73E-03	7.63E-03	4.73E-03	9.67E-03	1.60E-03	3.27E-03
Mercury	0.06	0.10	9.25E-05	1.41E-04	3.13E-05	4.75E-05	3.96E-05	6.02E-05	1.34E-05	2.04E-05
Methyl mercury	0.08	0.20	1.21E-04	2.88E-04	4.08E-05	9.72E-05	5.17E-05	1.23E-04	1.75E-05	4.17E-05
Nitroglycerin	0.17	0.33	2.45E-04	4.74E-04	8.29E-05	1.60E-04	1.05E-04	2.03E-04	3.55E-05	6.87E-05
Perchlorate	0.002	0.01	2.28E-06	1.26E-05	7.70E-07	4.27E-06	9.76E-07	5.42E-06	3.30E-07	1.83E-06
RDX	0.06	0.06	8.14E-05	8.19E-05	2.75E-05	2.77E-05	3.49E-05	3.51E-05	1.18E-05	1.19E-05
Selenium	1.2	1.6	1.66E-03	2.30E-03	5.62E-04	7.77E-04	7.13E-04	9.85E-04	2.41E-04	3.33E-04
Silver	0.01	0.01	1.35E-05	1.90E-05	4.55E-06	6.41E-06	5.77E-06	8.13E-06	1.95E-06	2.75E-06
Vanadium	0.61	1.2	8.81E-04	1.78E-03	2.98E-04	6.02E-04	3.78E-04	7.64E-04	1.28E-04	2.58E-04
Zinc	75	149	1.07E-01	2.14E-01	3.62E-02	7.24E-02	4.59E-02	9.18E-02	1.55E-02	3.10E-02

Appendix D.4-3 - Nearshore at Makua
Human Health Risk Calculations for Fish Consumption

			Non-carcinogenic Risk (Arithmetic Mean)			Non-carcinogenic Risk (MaxD)			Carcinogenic Risk (Mean)			Carcinogenic Risk (MaxD)		
Chemical	**Arithmetic Mean**	**MaxD**	RfDo	Subsistence	Recreational	RfDo	Subsistence	Recreational	SF	Subsistence	Recreational	SF	Subsistence	Recreational
Acetone	0.48	0.73	0.9	7.73E-04	2.61E-04	0.9	1.17E-03	3.94E-04	-	-	-	-	-	-
Aldrin	0.002	0.003	0.00003	9.43E-02	3.19E-02	0.00003	1.29E-01	4.37E-02	17	2.06E-05	6.96E-06	17	2.83E-05	9.55E-06
Aluminum	31	65	1	4.40E-02	1.49E-02	1	9.34E-02	3.16E-02	-	-	-	-	-	-
Arsenic, organic	23	37	-	-	-	-	-	-	-	-	-	-	-	-
Barium	7.0	32	0.07	1.43E-01	4.85E-02	0.07	6.49E-01	2.19E-01	-	-	-	-	-	-
BHC, alpha	0.002	0.008	0.0003	9.83E-03	3.32E-03	0.0003	3.93E-02	1.33E-02	6.3	7.97E-06	2.69E-06	6.3	3.18E-05	1.08E-05
BHC, delta	0.001	0.0003	0.0003	5.30E-03	1.79E-03	0.0003	1.44E-03	4.86E-04	-	-	-	-	-	-
BHC, gamma	0.003	0.006	0.0003	1.28E-02	4.32E-03	0.0003	3.02E-02	1.02E-02	1.3	2.14E-06	7.22E-07	1.3	5.04E-06	1.70E-06
Bis(2-Ethylhexyl)Phthalate	1.4	3.5	0.02	1.01E-01	3.41E-02	0.02	2.52E-01	8.50E-02	0.014	1.21E-05	4.09E-06	0.014	3.02E-05	1.02E-05
Cadmium	0.15	0.21	0.0005	4.34E-01	1.47E-01	0.0005	6.04E-01	2.04E-01	-	-	-	-	-	-
Chromium	5.7	10	1.5	5.43E-03	1.84E-03	1.5	9.96E-03	3.37E-03	-	-	-	-	-	-
Cobalt	0.23	0.41	0.02	1.66E-02	5.60E-03	0.02	2.97E-02	1.00E-02	-	-	-	-	-	-
Copper	4.2	9.8	0.04	1.51E-01	5.11E-02	0.04	3.51E-01	1.19E-01	-	-	-	-	-	-
4,4'-DDT	0.0005	0.0002	0.0005	1.41E-03	4.77E-04	0.0005	5.17E-04	1.75E-04	0.34	1.03E-07	3.48E-08	0.34	3.77E-08	1.27E-08
di-n-Butylphthalate	0.31	1.4	0.1	4.45E-03	1.50E-03	0.1	2.01E-02	6.80E-03	-	-	-	-	-	-
Heptachlor	0.002	0.01	0.0005	5.37E-03	1.82E-03	0.0005	1.61E-02	5.44E-03	4.5	5.18E-06	1.75E-06	4.5	1.55E-05	5.25E-06
Heptachlor epoxide	0.01	0.01	0.000013	6.76E-01	2.28E-01	0.000013	1.55E+00	5.23E-01	9.1	3.42E-05	1.16E-05	9.1	7.85E-05	2.65E-05
Iron	163	302	-	-	-	-	-	-	–	-	-	–	-	-
Lead	0.70	2.0	-	-	-	-	-	-	-	-	-	-	-	-
m,p-Xylenes	0.01	0.02	0.2	1.06E-04	3.58E-05	0.2	1.44E-04	4.86E-05	-	-	-	-	-	-
Manganese	7.7	16	0.024	4.60E-01	1.55E-01	0.024	9.40E-01	3.18E-01	-	-	-	-	-	-
Mercury	0.06	0.10	0.0003	3.08E-01	1.04E-01	0.0003	4.69E-01	1.58E-01	-	-	-	-	-	-
Methyl mercury	0.08	0.20	0.0001	1.21E+00	4.08E-01	0.0001	2.88E+00	9.72E-01	-	-	-	-	-	-
Nitroglycerin	0.17	0.33	0.0001	2.45E+00	8.29E-01	0.0001	4.74E+00	1.60E+00	0.017	1.79E-06	6.04E-07	0.017	3.46E-06	1.17E-06
Perchlorate	0.002	0.01	0.0007	3.25E-03	1.10E-03	0.0007	1.81E-02	6.11E-03	-	-	-	-	-	-
RDX	0.06	0.06	0.003	2.71E-02	9.17E-03	0.003	2.73E-02	9.23E-03	0.11	3.84E-06	1.30E-06	0.11	3.86E-06	1.31E-06
Selenium	1.2	1.6	0.005	3.33E-01	1.12E-01	0.005	4.60E-01	1.55E-01	-	-	-	-	-	-
Silver	0.01	0.01	0.005	2.69E-03	9.10E-04	0.005	3.79E-03	1.28E-03	-	-	-	-	-	-
Vanadium	0.61	1.2	0.02	4.41E-02	1.49E-02	0.02	8.91E-02	3.01E-02	-	-	-	-	-	-
Zinc	75	149	0.3	3.57E-01	1.21E-01	0.3	7.14E-01	2.41E-01	-	-	-	-	-	-

Appendix D.4-4 - Nearshore Background (at Sandy Beach)
Human Health Risk Calculations for Fish Consumption

$$Intake = \frac{C_{sf} \times CR \times EF \times ED}{BW \times AT}$$

CR = 0.1006 for subsistence; 0.034 for recreational
EF = 365
ED = 30
BW = 70
AT = noncarcinogens = 30 yrs * 365 days/yr;
carcinog = 70 yrs * 365 days/yr

			Noncarcinogens				Carcinogens			
			Subsistence Intake (mg/kg-day)		**Recreational Intake (mg/kg-day)**		**Subsistence Intake (mg/kg-day)**		**Recreational Intake (mg/kg-day**	
Chemical	**Arithmetic Mean**	**MaxD**	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD	Arithmetic Mea	MaxD
Acetone	0.33	0.60	4.80E-04	8.62E-04	1.62E-04	2.91E-04	2.06E-04	3.70E-04	6.95E-05	1.25E-04
Aldrin	0.003	0.006	3.84E-06	9.20E-06	1.30E-06	3.11E-06	1.64E-06	3.94E-06	5.56E-07	1.33E-06
Aluminum	796	4720	1.14E+00	6.78E+00	3.87E-01	2.29E+00	4.90E-01	2.91E+00	1.66E-01	9.83E-01
Antimony	0.02	0.03	2.31E-05	3.72E-05	7.82E-06	1.26E-05	9.92E-06	1.60E-05	3.35E-06	5.39E-06
Arsenic, organic	19	53	2.68E-02	7.62E-02	9.07E-03	2.57E-02	1.15E-02	3.26E-02	3.89E-03	1.10E-02
Barium	5.6	14	8.12E-03	2.04E-02	2.74E-03	6.90E-03	3.48E-03	8.75E-03	1.18E-03	2.96E-03
Beryllium	0.01	0.07	1.94E-05	9.92E-05	6.56E-06	3.35E-05	8.32E-06	4.25E-05	2.81E-06	1.44E-05
BHC, gamma	0.004	0.002	5.55E-06	2.73E-06	1.87E-06	9.23E-07	2.38E-06	1.17E-06	8.03E-07	3.96E-07
Bis(2-Ethylhexyl)Phthalate	0.06	0.05	8.05E-05	7.04E-05	2.72E-05	2.38E-05	3.45E-05	3.02E-05	1.17E-05	1.02E-05
Cadmium	0.11	0.20	1.56E-04	2.87E-04	5.28E-05	9.71E-05	6.69E-05	1.23E-04	2.26E-05	4.16E-05
Chromium	7.3	32	1.05E-02	4.56E-02	3.54E-03	1.54E-02	4.48E-03	1.95E-02	1.52E-03	6.60E-03
Cobalt	0.83	4.3	1.19E-03	6.19E-03	4.04E-04	2.09E-03	5.12E-04	2.65E-03	1.73E-04	8.97E-04
Copper	4.8	17	6.86E-03	2.37E-02	2.32E-03	8.01E-03	2.94E-03	1.02E-02	9.94E-04	3.43E-03
4,4'-DDT	0.001	0.002	1.42E-06	3.02E-06	4.81E-07	1.02E-06	6.10E-07	1.29E-06	2.06E-07	4.37E-07
Diethyl phthalate	0.04	0.02	5.27E-05	2.73E-05	1.78E-05	9.23E-06	2.26E-05	1.17E-05	7.64E-06	3.96E-06
di-n-Butylphthalate	0.13	0.61	1.93E-04	8.77E-04	6.52E-05	2.96E-04	8.26E-05	3.76E-04	2.79E-05	1.27E-04
Heptachlor	0.003	0.01	4.21E-06	8.19E-06	1.42E-06	2.77E-06	1.81E-06	3.51E-06	6.10E-07	1.19E-06
Heptachlor epoxide	0.003	0.01	4.26E-06	1.09E-05	1.44E-06	3.69E-06	1.82E-06	4.68E-06	6.17E-07	1.58E-06
Iron	1230	6960	1.77E+00	1.00E+01	5.97E-01	3.38E+00	7.57E-01	4.29E+00	2.56E-01	1.45E+00
Lead	1.4	2.8	2.07E-03	3.95E-03	6.99E-04	1.34E-03	8.87E-04	1.69E-03	3.00E-04	5.72E-04
m,p-Xylenes	0.01	0.02	1.99E-05	2.30E-05	6.73E-06	7.77E-06	8.54E-06	9.85E-06	2.89E-06	3.33E-06
Manganese	28	147	4.08E-02	2.11E-01	1.38E-02	7.14E-02	1.75E-02	9.05E-02	5.91E-03	3.06E-02
Mercury	0.03	0.04	3.99E-05	6.18E-05	1.35E-05	2.09E-05	1.71E-05	2.65E-05	5.78E-06	8.95E-06
Methyl mercury	0.04	0.06	5.22E-05	8.05E-05	1.77E-05	2.72E-05	2.24E-05	3.45E-05	7.57E-06	1.17E-05
Perchlorate	0.02	0.11	2.89E-05	1.58E-04	9.76E-06	5.34E-05	1.24E-05	6.78E-05	4.18E-06	2.29E-05
Selenium	1.0	1.8	1.43E-03	2.59E-03	4.83E-04	8.74E-04	6.13E-04	1.11E-03	2.07E-04	3.75E-04
Silver	0.01	0.03	1.45E-05	4.46E-05	4.91E-06	1.51E-05	6.23E-06	1.91E-05	2.11E-06	6.45E-06
Thallium	0.01	0.01	1.10E-05	1.81E-05	3.71E-06	6.12E-06	4.71E-06	7.76E-06	1.59E-06	2.62E-06
Vanadium	3.8	20	5.48E-03	2.92E-02	1.85E-03	9.86E-03	2.35E-03	1.25E-02	7.94E-04	4.23E-03
Zinc	66	77	9.55E-02	1.11E-01	3.23E-02	3.74E-02	4.09E-02	4.74E-02	1.38E-02	1.60E-02
TCDD equivalents	3.6E-14	1.7E-13	5.22E-17	2.47E-16	1.77E-17	8.35E-17	2.24E-17	1.06E-16	7.57E-18	3.58E-17

Appendix D.4-4 - Nearshore Background (at Sandy Beach)
Human Health Risk Calculations for Fish Consumption

			Non-carcinogenic Risk (Arithmetic Mean)			Non-carcinogenic Risk (MaxD)			Carcinogenic Risk (Mean)			Carcinogenic Risk (MaxD)		
Chemical	**Arithmetic Mean**	**MaxD**	RfDo	Subsistence	Recreational	RfDo	Subsistence	Recreational	SF	Subsistence	Recreational	SF	Subsistence	Recreational
Acetone	0.33	0.60	0.9	5.33E-04	1.80E-04	0.9	9.58E-04	3.24E-04	-	-	-	-	-	-
Aldrin	0.003	0.006	0.00003	1.28E-01	4.32E-02	0.00003	3.07E-01	1.04E-01	17	2.80E-05	9.45E-06	17	6.70E-05	2.26E-05
Aluminum	796	4720	1	1.14E+00	3.87E-01	1	6.78E+00	2.29E+00	-	-	-	-	-	-
Antimony	0.02	0.03	0.0004	5.79E-02	1.96E-02	0.0004	9.31E-02	3.15E-02	-	-	-	-	-	-
Arsenic, organic	19	53	-	-	-	-	-	-	-	-	-	-	-	-
Barium	5.6	14	0.07	1.16E-01	3.92E-02	0.07	2.92E-01	9.85E-02	-	-	-	-	-	-
Beryllium	0.01	0.07	0.002	9.70E-03	3.28E-03	0.002	4.96E-02	1.68E-02	-	-	-	-	-	-
BHC, gamma	0.004	0.002	0.0003	1.85E-02	6.25E-03	0.0003	9.10E-03	3.08E-03	1.3	3.09E-06	1.04E-06	1.3	1.52E-06	5.14E-07
Bis(2-Ethylhexyl)Phthalate	0.06	0.05	0.02	4.03E-03	1.36E-03	0.02	3.52E-03	1.19E-03	0.014	4.83E-07	1.63E-07	0.014	4.23E-07	1.43E-07
Cadmium	0.11	0.20	0.0005	3.12E-01	1.06E-01	0.0005	5.75E-01	1.94E-01	-	-	-	-	-	-
Chromium	7.3	32	1.5	6.98E-03	2.36E-03	1.5	3.04E-02	1.03E-02	-	-	-	-	-	-
Cobalt	0.83	4.3	0.02	5.97E-02	2.02E-02	0.02	3.10E-01	1.05E-01	-	-	-	-	-	-
Copper	4.8	17	0.04	1.72E-01	5.80E-02	0.04	5.93E-01	2.00E-01	-	-	-	-	-	-
4,4'-DDT	0.001	0.002	0.0005	2.84E-03	9.61E-04	0.0005	6.04E-03	2.04E-03	0.34	2.07E-07	7.00E-08	0.34	4.40E-07	1.49E-07
Diethyl phthalate	0.04	0.02	0.8	6.59E-05	2.23E-05	0.8	3.41E-05	1.15E-05	-	-	-	-	-	-
di-n-Butylphthalate	0.13	0.61	0.1	1.93E-03	6.52E-04	0.1	8.77E-03	2.96E-03	-	-	-	-	-	-
Heptachlor	0.003	0.01	0.2	2.11E-05	7.12E-06	0.2	4.10E-05	1.38E-05	4.5	8.13E-06	2.75E-06	4.5	1.58E-05	5.34E-06
Heptachlor epoxide	0.003	0.01	0.000013	3.28E-01	1.11E-01	0.000013	8.40E-01	2.84E-01	9.1	1.66E-05	5.61E-06	9.1	4.26E-05	1.44E-05
Iron	1230	6960	-	-	-	-	-	-	–	-	-	–	-	-
Lead	1.4	2.8	-	-	-	-	-	-	-	-	-	-	-	-
m,p-Xylenes	0.01	0.02	0.2	9.96E-05	3.37E-05	0.2	1.15E-04	3.89E-05	-	-	-	-	-	-
Manganese	28	147	0.024	1.70E+00	5.75E-01	0.024	8.80E+00	2.98E+00	-	-	-	-	-	-
Mercury	0.03	0.04	0.0003	1.33E-01	4.50E-02	0.0003	2.06E-01	6.96E-02	-	-	-	-	-	-
Methyl mercury	0.04	0.06	0.0001	5.22E-01	1.77E-01	0.0001	8.05E-01	2.72E-01	-	-	-	-	-	-
Perchlorate	0.02	0.11	0.0007	4.13E-02	1.39E-02	0.0007	2.26E-01	7.63E-02	-	-	-	-	-	-
Selenium	1.0	1.8	0.005	2.86E-01	9.67E-02	0.005	5.17E-01	1.75E-01	-	-	-	-	-	-
Silver	0.01	0.03	0.005	2.91E-03	9.83E-04	0.005	8.91E-03	3.01E-03	-	-	-	-	-	-
Thallium	0.01	0.01	0.00008	1.37E-01	4.64E-02	0.00008	2.26E-01	7.65E-02	-	-	-	-	-	-
Vanadium	3.8	20	0.02	2.74E-01	9.27E-02	0.02	1.46E+00	4.93E-01	-	-	-	-	-	-
Zinc	66	77	0.3	3.18E-01	1.08E-01	0.3	3.69E-01	1.25E-01	-	-	-	-	-	-
TCDD equivalents	3.6E-14	1.7E-13	-	-	-	-	-	-	150000	3.36E-12	1.14E-12	150000	1.59E-11	5.37E-12

Appendix D.4-5 - Nearshore at Makua Human Health Risk Calculations for Consumption of Limu Tissue

$$Intake = \frac{C_{sf} \times CR \times EF \times ED}{BW \times AT}$$

CR = 0.0182 subsistence; 0.0052 recreational
EF = 365
ED = 30
BW = 70
AT = noncarcinogens = 30 yrs * 365 days/yr;
carcinog = 70 yrs * 365 days/yr

			Noncarcinogens				Carcinogens			
			Subsistence Intake (mg/kg-day)		**Recreational Intake (mg/kg-day)**		**Subsistence Intake (mg/kg-day)**		**Recreational Intake (mg/kg-day)**	
Chemical	**Arithmetic Mean**	**MaxD**	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD	Arithmetic Mean	MaxD
Aluminum	422	1,120	1.10E-01	2.91E-01	3.13E-02	8.32E-02	4.70E-02	1.25E-01	1.34E-02	3.57E-02
Antimony	0.06	0.15	1.62E-05	3.77E-05	4.63E-06	1.08E-05	6.94E-06	1.62E-05	1.98E-06	4.62E-06
Arsenic, inorganic	66	109	1.72E-02	2.83E-02	4.92E-03	8.10E-03	7.38E-03	1.21E-02	2.11E-03	3.47E-03
Barium	9.0	13	2.33E-03	3.46E-03	6.66E-04	9.88E-04	1.00E-03	1.48E-03	2.86E-04	4.23E-04
Beryllium	0.01	0.02	1.99E-06	5.20E-06	5.67E-07	1.49E-06	8.51E-07	2.23E-06	2.43E-07	6.37E-07
Bis(2-Ethylhexyl)Phthalate	0.08	0.09	2.16E-05	2.24E-05	6.17E-06	6.39E-06	9.25E-06	9.58E-06	2.64E-06	2.74E-06
Cadmium	0.24	0.28	6.34E-05	7.28E-05	1.81E-05	2.08E-05	2.72E-05	3.12E-05	7.76E-06	8.91E-06
Chromium	2.2	6.0	5.64E-04	1.56E-03	1.61E-04	4.46E-04	2.42E-04	6.69E-04	6.90E-05	1.91E-04
Cobalt	0.72	1.3	1.88E-04	3.25E-04	5.36E-05	9.29E-05	8.04E-05	1.39E-04	2.30E-05	3.98E-05
Copper	2.6	4.6	6.88E-04	1.19E-03	1.97E-04	3.39E-04	2.95E-04	5.09E-04	8.43E-05	1.45E-04
di-n-Butylphthalate	0.14	0.48	3.54E-05	1.25E-04	1.01E-05	3.57E-05	1.52E-05	5.35E-05	4.33E-06	1.53E-05
Heptachlor	0.001	0.001	3.24E-07	1.87E-07	9.27E-08	5.35E-08	1.39E-07	8.02E-08	3.97E-08	2.29E-08
Iron	671	1,860	1.74E-01	4.84E-01	4.98E-02	1.38E-01	7.47E-02	2.07E-01	2.13E-02	5.92E-02
Lead	1.5	3.9	3.95E-04	1.01E-03	1.13E-04	2.88E-04	1.69E-04	4.32E-04	4.84E-05	1.24E-04
m,p-Xylenes	0.02	0.02	5.31E-06	4.16E-06	1.52E-06	1.19E-06	2.28E-06	1.78E-06	6.51E-07	5.09E-07
Manganese	16	39	4.12E-03	1.01E-02	1.18E-03	2.90E-03	1.77E-03	4.35E-03	5.05E-04	1.24E-03
Perchlorate	0.02	0.05	4.48E-06	1.35E-05	1.28E-06	3.86E-06	1.92E-06	5.79E-06	5.48E-07	1.66E-06
Selenium	0.28	0.07	7.24E-05	1.93E-05	2.07E-05	5.52E-06	3.10E-05	8.28E-06	8.86E-06	2.37E-06
Silver	0.07	0.14	1.89E-05	3.67E-05	5.41E-06	1.05E-05	8.11E-06	1.57E-05	2.32E-06	4.49E-06
Thallium	0.02	0.03	4.31E-06	6.97E-06	1.23E-06	1.99E-06	1.85E-06	2.99E-06	5.28E-07	8.53E-07
Vanadium	6.0	13	1.56E-03	3.43E-03	4.46E-04	9.81E-04	6.69E-04	1.47E-03	1.91E-04	4.20E-04
Zinc	11	12	2.75E-03	3.20E-03	7.86E-04	9.14E-04	1.18E-03	1.37E-03	3.37E-04	3.92E-04
TCDD equivalents	2.33E-14	6.72E-14	6.06E-18	1.75E-17	1.73E-18	4.99E-18	2.60E-18	7.49E-18	7.42E-19	2.14E-18

Appendix D.4-5 - Nearshore at Makua Human Health Risk Calculations for Consumption of Limu Tissue

			Non-carcinogenic Risk (Arithmetic Mean			Non-carcinogenic Risk (MaxD)			Carcinogenic Risk (Mean)			Carcinogenic Risk (Ma	
Chemical	**Arithmetic Mean**	**MaxD**	RfDo	Subsistence	Recreational	RfDo	Subsistence	Recreational	SF	Subsistence	Recreational	SF	Subsistence
Aluminum	422	1,120	1	1.10E-01	3.13E-02	1	2.91E-01	8.32E-02	-	-	-	-	-
Antimony	0.06	0.15	0.0004	4.05E-02	1.16E-02	0.0004	9.43E-02	2.69E-02	-	-	-	-	-
Arsenic, inorganic	66	109	0.0003	5.74E+01	1.64E+01	0.0003	9.45E+01	2.70E+01	1.5	1.11E-02	3.16E-03	1.5	1.82E-02
Barium	9.0	13	0.07	3.33E-02	9.52E-03	0.07	4.94E-02	1.41E-02	-	-	-	-	-
Beryllium	0.01	0.02	0.002	9.93E-04	2.84E-04	0.002	2.60E-03	7.43E-04	-	-	-	-	-
Bis(2-Ethylhexyl)Phthalate	0.08	0.09	0.02	1.08E-03	3.08E-04	0.02	1.12E-03	3.19E-04	0.014	1.30E-07	3.70E-08	0.014	1.34E-07
Cadmium	0.24	0.28	0.0005	1.27E-01	3.62E-02	0.0005	1.46E-01	4.16E-02	-	-	-	-	-
Chromium	2.2	6.0	1.5	3.76E-04	1.07E-04	1.5	1.04E-03	2.97E-04	-	-	-	-	-
Cobalt	0.72	1.3	0.02	9.38E-03	2.68E-03	0.02	1.63E-02	4.64E-03	-	-	-	-	-
Copper	2.6	4.6	0.04	1.72E-02	4.92E-03	0.04	2.97E-02	8.49E-03	-	-	-	-	-
di-n-Butylphthalate	0.14	0.48	0.1	3.54E-04	1.01E-04	0.1	1.25E-03	3.57E-04	-	-	-	-	-
Heptachlor	0.001	0.001	0.0005	6.49E-04	1.85E-04	0.0005	3.74E-04	1.07E-04	4.5	6.26E-07	1.79E-07	4.5	3.61E-07
Iron	671	1,860	-	-	-	-	-	-	–	-	-	–	-
Lead	1.5	3.9	-	-	-	-	-	-	-	-	-	-	-
m,p-Xylenes	0.02	0.02	0.2	2.66E-05	7.59E-06	0.2	2.08E-05	5.94E-06	-	-	-	-	-
Manganese	16	39	0.024	1.72E-01	4.91E-02	0.024	4.23E-01	1.21E-01	-	-	-	-	-
Perchlorate	0.02	0.05	0.0007	6.39E-03	1.83E-03	0.0007	1.93E-02	5.52E-03	-	-	-	-	-
Selenium	0.28	0.07	0.005	1.45E-02	4.14E-03	0.005	3.86E-03	1.10E-03	-	-	-	-	-
Silver	0.07	0.14	0.005	3.78E-03	1.08E-03	0.005	7.33E-03	2.09E-03	-	-	-	-	-
Thallium	0.02	0.03	0.00008	5.39E-02	1.54E-02	0.00008	8.71E-02	2.49E-02	-	-	-	-	-
Vanadium	6.0	13	0.02	7.81E-02	2.23E-02	0.02	1.72E-01	4.90E-02	-	-	-	-	-
Zinc	11	12	0.3	9.17E-03	2.62E-03	0.3	1.07E-02	3.05E-03	-	-	-	-	-
TCDD equivalents	2.33E-14	6.72E-14	-	-	-	-	-	-	150000	3.90E-13	1.11E-13	150000	1.12E-12

Appendix D.4-5 - Nearshore at Makua Human Health Risk Calculations for Consumption of Limu Tissue

			xD)
Chemical	**Arithmetic Mean**	**MaxD**	Recreational
Aluminum	422	1,120	-
Antimony	0.06	0.15	-
Arsenic, inorganic	66	109	5.21E-03
Barium	9.0	13	-
Beryllium	0.01	0.02	-
Bis(2-Ethylhexyl)Phthalate	0.08	0.09	3.83E-08
Cadmium	0.24	0.28	-
Chromium	2.2	6.0	-
Cobalt	0.72	1.3	-
Copper	2.6	4.6	-
di-n-Butylphthalate	0.14	0.48	-
Heptachlor	0.001	0.001	1.03E-07
Iron	671	1,860	-
Lead	1.5	3.9	-
m,p-Xylenes	0.02	0.02	-
Manganese	16	39	-
Perchlorate	0.02	0.05	-
Selenium	0.28	0.07	-
Silver	0.07	0.14	-
Thallium	0.02	0.03	-
Vanadium	6.0	13	-
Zinc	11	12	-
TCDD equivalents	2.33E-14	6.72E-14	3.21E-13

Appendix D.4-6 - North and South Site Human Health Risk Calculations for Shellfish Consumption

$$Intake = \frac{C_{sf} \times CR \times EF \times ED}{BW \times AT}$$

CR = 0.1006 for subsistence; 0.034 for recreational
EF = 365
ED = 30
BW = 70
AT = noncarcinogens = 30 yrs * 365 days/yr;
carcinog = 70 yrs * 365 days/yr

		Noncarcinogens		Carcinogens							
		Subsistence Intake (mg/kg-day)	**Recreational Intake (mg/kg-day)**	**Subsistence Intake (mg/kg-day)**	**Recreational Intake (mg/kg-day)**	**Non-carcinogenic HI (MaxD)**			**Carcinogenic Risk (MaxD)**		
Chemical	**MaxD (mg/kg)**	MaxD	MaxD	MaxD	MaxD	RfDo	Subsistence	Recreational	SF	Subsistence	Recreational
Aluminum	143	2.06E-01	6.95E-02	8.81E-02	2.98E-02	1	2.06E-01	6.95E-02	-	-	-
Arsenic, organic	3.6	5.17E-03	1.75E-03	2.22E-03	7.49E-04	-	-	-	-	-	-
Barium	57.8	8.31E-02	2.81E-02	3.56E-02	1.20E-02	0.2	4.15E-01	1.40E-01	-	-	-
Chromium	1.3	1.87E-03	6.31E-04	8.01E-04	2.71E-04	1.5	1.25E-03	4.21E-04	-	-	-
Cobalt	0.8	1.15E-03	3.89E-04	4.93E-04	1.67E-04	3.00E-04	3.83E+00	1.30E+00	-	-	-
Copper	39.7	5.71E-02	1.93E-02	2.45E-02	8.26E-03	0.04	1.43E+00	4.82E-01	-	-	-
Iron	226	3.25E-01	1.10E-01	1.39E-01	4.70E-02	0.7	4.64E-01	1.57E-01	-	-	-
Lead	0.16	2.30E-04	7.77E-05	9.85E-05	3.33E-05	-	-	-	-	-	-
Manganese	122	1.75E-01	5.93E-02	7.51E-02	2.54E-02	0.024	7.31E+00	2.47E+00	-	-	-
Mercury	0.022	3.16E-05	1.07E-05	1.36E-05	4.58E-06	0.0003	1.05E-01	3.56E-02	-	-	-
Selenium	1.2	1.72E-03	5.83E-04	7.39E-04	2.50E-04	0.005	3.45E-01	1.17E-01	-	-	-
Vanadium	0.77	1.11E-03	3.74E-04	4.74E-04	1.60E-04	0.02	5.53E-02	1.87E-02	-	-	-
Zinc	31.2	4.48E-02	1.52E-02	1.92E-02	6.49E-03	0.3	1.49E-01	5.05E-02	-	-	-
TCDD equivalents	3.74E-07	5.37E-10	1.82E-10	2.30E-10	7.78E-11	-	-	-	150000	3.45E-05	1.17E-05

Appendix D.4-7 - Background (Nanakuli Muliwai) Human Health Risk Calculations for Shellfish Consumption

$$Intake = \frac{C_{sf} \times CR \times EF \times ED}{BW \times AT}$$

CR = 0.1006 for subsistence; 0.034 for recreational
EF = 365
ED = 30
BW = 70
AT = noncarcinogens = 30 yrs * 365 days/yr;
carcinog = 70 yrs * 365 days/yr

		Noncarcinogens		Carcinogens							
		Subsistence Intake (mg/kg-day)	**Recreational Intake (mg/kg-day)**	**Subsistence Intake (mg/kg-day)**	**Recreational Intake (mg/kg-day)**	**Non-carcinogenic HI (MaxD)**			**Carcinogenic Risk (MaxD)**		
Chemical	**MaxD**	MaxD	MaxD	MaxD	MaxD	RfDo	Subsistence	Recreational	SF	Subsistence	Recreational
Aluminum	73.2	1.05E-01	3.56E-02	4.51E-02	1.52E-02	1.0	1.05E-01	3.56E-02	-	-	-
Arsenic, organic	3.9	5.60E-03	1.89E-03	2.40E-03	8.12E-04	-	-	-	-	-	-
Barium	14.5	2.08E-02	7.04E-03	8.93E-03	3.02E-03	0.2	1.04E-01	3.52E-02	-	-	-
Chromium	1.2	1.72E-03	5.83E-04	7.39E-04	2.50E-04	1.5	1.15E-03	3.89E-04	-	-	-
Cobalt	0.28	4.02E-04	1.36E-04	1.72E-04	5.83E-05	0.0003	1.34E+00	4.53E-01	-	-	-
Copper	65.7	9.44E-02	3.19E-02	4.05E-02	1.37E-02	0.04	2.36E+00	7.98E-01	-	-	-
Iron	110	1.58E-01	5.34E-02	6.78E-02	2.29E-02	0.7	2.26E-01	7.63E-02	-	-	-
Manganese	32.5	4.67E-02	1.58E-02	2.00E-02	6.77E-03	0.024	1.95E+00	6.58E-01	-	-	-
Selenium	1.7	2.44E-03	8.26E-04	1.05E-03	3.54E-04	0.005	4.89E-01	1.65E-01	-	-	-
Silver	0.24	3.45E-04	1.17E-04	1.48E-04	5.00E-05	0.005	6.90E-02	2.33E-02	-	-	-
Vanadium	0.36	5.17E-04	1.75E-04	2.22E-04	7.49E-05	0.02	2.59E-02	8.74E-03	-	-	-
Zinc	485	6.97E-01	2.36E-01	2.99E-01	1.01E-01	0.3	2.32E+00	7.85E-01	-	-	-
TCDD equivalents	3.3E-07	4.74E-10	1.60E-10	2.03E-10	6.87E-11	-	-	-	150000	3.05E-05	1.03E-05

Appendix D.4-8 - Nearshore at Makua Human Health Risk Calculations for Shellfish Consumption

$$Intake = \frac{C_{sf} \times CR \times EF \times ED}{BW \times AT}$$

CR = 0.1006 for subsistence; 0.034 for recreational
EF = 365
ED = 30
BW = 70
AT = noncarcinogens = 30 yrs * 365 days/yr;
carcinog = 70 yrs * 365 days/yr

		Noncarcinogens		Carcinogens							
		Subsistence Intake (mg/kg-day)	**Recreational Intake (mg/kg-day)**	**Subsistence Intake (mg/kg-day)**	**Recreational Intake (mg/kg-day)**	**Non-carcinogenic Risk (MaxD)**			**Carcinogenic Risk (MaxD)**		
Chemical	**MaxD**	MaxD	MaxD	MaxD	MaxD	RfDo	Subsistence	Recreational	SF	Subsistence	Recreational
Aldrin	0.0011	1.58E-06	5.34E-07	6.78E-07	2.29E-07	0.00003	5.27E-02	1.78E-02	17	1.15E-05	3.89E-06
Aluminum	102	1.47E-01	4.95E-02	6.28E-02	2.12E-02	1	1.47E-01	4.95E-02	-	-	-
Arsenic, organic	26.4	3.79E-02	1.28E-02	1.63E-02	5.50E-03	-	-	-	-	-	-
Barium	2.3	3.31E-03	1.12E-03	1.42E-03	4.79E-04	0.2	1.65E-02	5.59E-03	-	-	-
Cadmium	2	2.87E-03	9.71E-04	1.23E-03	4.16E-04	0.0005	5.75E+00	1.94E+00	-	-	-
Chromium	1.2	1.72E-03	5.83E-04	7.39E-04	2.50E-04	1.5	1.15E-03	3.89E-04	-	-	-
Cobalt	0.37	5.32E-04	1.80E-04	2.28E-04	7.70E-05	0.0003	1.77E+00	5.99E-01	-	-	-
Copper	25.7	3.69E-02	1.25E-02	1.58E-02	5.35E-03	0.04	9.23E-01	3.12E-01	-	-	-
Iron	131	1.88E-01	6.36E-02	8.07E-02	2.73E-02	0.7	2.69E-01	9.09E-02	-	-	-
Lead	0.33	4.74E-04	1.60E-04	2.03E-04	6.87E-05	-	-	-	-	-	-
Manganese	3.5	5.03E-03	1.70E-03	2.16E-03	7.29E-04	0.024	2.10E-01	7.08E-02	-	-	-
Mercury	0.041	5.89E-05	1.99E-05	2.53E-05	8.53E-06	0.0003	1.96E-01	6.64E-02	-	-	-
Perchlorate	1.05	1.51E-03	5.10E-04	6.47E-04	2.19E-04	0.0007	2.16E+00	7.29E-01	-	-	-
Selenium	1.7	2.44E-03	8.26E-04	1.05E-03	3.54E-04	0.005	4.89E-01	1.65E-01	-	-	-
Silver	0.15	2.16E-04	7.29E-05	9.24E-05	3.12E-05	0.005	4.31E-02	1.46E-02	-	-	-
Toluene	0.0011	1.58E-06	5.34E-07	6.78E-07	2.29E-07	0.08	1.98E-05	6.68E-06	-	-	-
Vanadium	0.56	8.05E-04	2.72E-04	3.45E-04	1.17E-04	0.02	4.02E-02	1.36E-02	-	-	-
Zinc	47.4	6.81E-02	2.30E-02	2.92E-02	9.87E-03	0.3	2.27E-01	7.67E-02	-	-	-
TCDD equivalents	2.4E-09	3.45E-12	1.17E-12	1.48E-12	5.00E-13	-	-	-	150000	2.22E-07	7.49E-08

Appendix D.4-9- Nearshore Background (at Sandy Beach) Human Health Risk Calculations for Shellfish Consumption

$$Intake = \frac{C_{sf} \times CR \times EF \times ED}{BW \times AT}$$

CR = 0.1006 for subsistence; 0.034 for recreational
EF = 365
ED = 30
BW = 70
AT = noncarcinogens = 30 yrs * 365 days/yr;
carcinog = 70 yrs * 365 days/yr

		Noncarcinogens		Carcinogens							
		Subsistence Intake (mg/kg-day)	**Recreational Intake (mg/kg-day)**	**Subsistence Intake (mg/kg-day)**	**Recreational Intake (mg/kg-day)**	**Non-carcinogenic Risk (MaxD)**			**Carcinogenic Risk (MaxD)**		
Chemical	**MaxD**	MaxD	MaxD	MaxD	MaxD	RfDo	Subsistence	Recreational	SF	Subsistence	Recreational
Aluminum	61.8	8.88E-02	3.00E-02	3.81E-02	1.29E-02	1	8.88E-02	3.00E-02	-	-	-
Arsenic, organic	1.2	1.72E-03	5.83E-04	7.39E-04	2.50E-04	-	-	-	-	-	-
Barium	1.6	2.30E-03	7.77E-04	9.85E-04	3.33E-04	0.2	1.15E-02	3.89E-03	-	-	-
Beryllium	0.062	8.91E-05	3.01E-05	3.82E-05	1.29E-05	0.002	4.46E-02	1.51E-02	-	-	-
Chromium	1.2	1.72E-03	5.83E-04	7.39E-04	2.50E-04	1.5	1.15E-03	3.89E-04	-	-	-
Cobalt	0.45	6.47E-04	2.19E-04	2.77E-04	9.37E-05	0.0003	2.16E+00	7.29E-01	-	-	-
Copper	1.9	2.73E-03	9.23E-04	1.17E-03	3.96E-04	0.04	6.83E-02	2.31E-02	-	-	-
Iron	100	1.44E-01	4.86E-02	6.16E-02	2.08E-02	0.7	2.05E-01	6.94E-02	-	-	-
Lead	0.98	1.41E-03	4.76E-04	6.04E-04	2.04E-04	-	-	-	-	-	-
Manganese	1.8	2.59E-03	8.74E-04	1.11E-03	3.75E-04	0.024	1.08E-01	3.64E-02	-	-	-
Selenium	1.2	1.72E-03	5.83E-04	7.39E-04	2.50E-04	0.005	3.45E-01	1.17E-01	-	-	-
Toluene	8.90E-04	1.28E-06	4.32E-07	5.48E-07	1.85E-07	0.08	1.60E-05	5.40E-06	-	-	-
Vanadium	0.36	5.17E-04	1.75E-04	2.22E-04	7.49E-05	0.02	2.59E-02	8.74E-03	-	-	-
Zinc	5.9	8.48E-03	2.87E-03	3.63E-03	1.23E-03	0.3	2.83E-02	9.55E-03	-	-	-
TCDD equivalents	8.27E-07	1.19E-09	4.02E-10	5.09E-10	1.72E-10	-	-	-	150000	7.64E-05	2.58E-05